

OPERATING INSTRUCTIONS
PHYSIOMED-Expert



00856 GB

PHYSIOMED®

TECHNOLOGY FOR THERAPY

The technical data in this manual is as at the time of printing and subject to alteration.

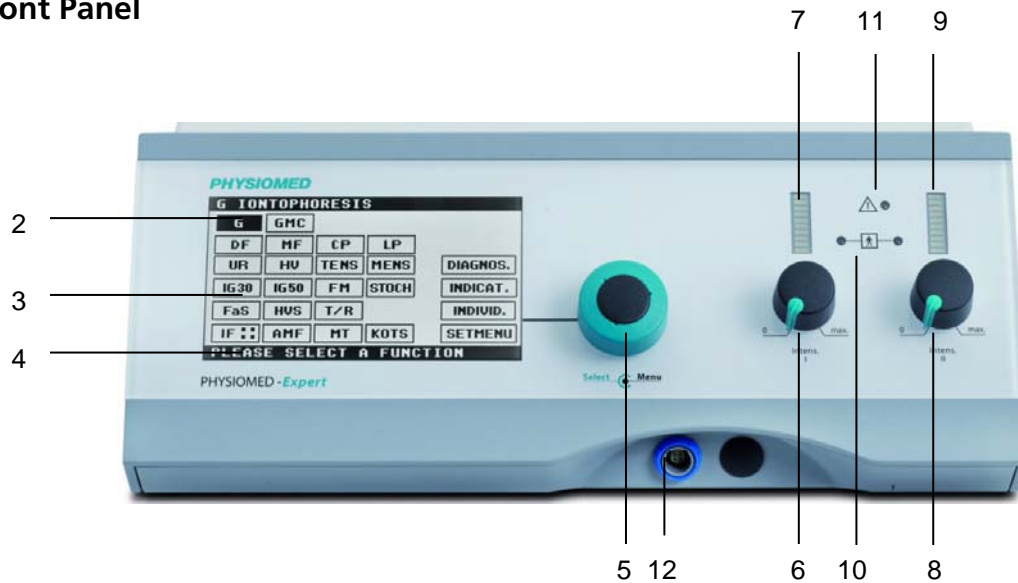
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Last updated August 30, 2010.

Instrument Overview

Front Panel



Rear Face



Legend

1	Mains Module	6	Intensity Control Circuit I	11	Output Indicator
2	Upper Status Bar	7	Pulse Indicator Circuit I	12	Patient Lead Connector
3	Display	8	Intensity Control Circuit II	13	Manual Release Key or Therapy Pause Button Socket
4	Lower Status Bar	9	Pulse Indicator Circuit II	14	SIM Socket
5	Data Selector	10	Patient Current Indicator	15	VAC Socket

Symbols

	CAUTION! Please refer to the operating instructions and consider the physiological effects!
	Type BF component, not connected to protective ground wire!

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1 Introduction

With your **PHYSIOMED-Expert**, you have acquired a high-quality and extremely versatile unit for stimulation current therapy.

The instrument will only show its true potential, however, if you are well informed about its functions. For this reason, carefully read the *Operating Instructions* and familiarise yourself with the use of the instrument.

1.1 Instrument Description

PHYSIOMED-Expert is a two-channel stimulation current therapy unit. You can apply the whole range of current modes from low to medium frequency including the classic interference current. Moreover, the unit offers you programs for stimulation current diagnosis. The unit can also be used for simultaneous therapy (stimulation current and ultrasound in ONE treatment, page 53).

Therapy modes of **PHYSIOMED-Expert** may be accessed *directly* or, by a proposed treatment, via the indications menu (page 54). Moreover, the unit enables you to memorise up to 25 individual treatment programs or current sequences (*potpourris*, page 58).

All functions of **PHYSIOMED-Expert** are controlled by a microprocessor, which also continuously monitors all important components and suppresses erroneously initiated operating steps. After switching on, all instrument functions are checked during an automatic self-test routine. The instrument complies with all current safety standards.

The instrument meets the requirements of the EC directive concerning medical devices (93/42/EEC) and is therefore CE-labelled.

1.2 Application

PHYSIOMED-Expert was designed for the following applications:

Stimulation current therapy

- Pain therapy
- Circulatory stimulation
- Mobilisation and muscle stimulation
- Spasticity treatment according to Hufschmidt and Jantsch
- Iontophoresis

Stimulation current diagnosis

- Faradic excitability test
- Medium-frequency test according to Lange
- Accommodation quotient
- Rheobase/chronaxy
- I/T-diagnosis

Simultaneous therapy

- Simultaneous application of stimulation current and ultrasound

Warning

The instrument may only be operated by qualified personnel who have undergone special training!

1.3 Contraindications

Contraindications to stimulation current therapy or simultaneous treatment:

- Highly inflammatory, fever-prone disorders
- Pregnancy
- Patients with cardiac pacemakers or other implanted stimulators
- Malignant tumours
- Skin lesions
- Implants containing metal parts within the area of treatment

Contraindications to ultrasound therapy or simultaneous treatment:

- Fever-prone disorders and acute inflammatory processes
- Pregnancy
- Tuberculosis, gastric ulcers
- Vascular disorders of the extremities (thrombophlebitis, thrombosis, varicosis)
- Tumours
- Circulatory insufficiency, coronary diseases, cardiac dysrhythmias
- Acute articular rheumatism
- Diabetes mellitus
- Septic inflammations
- Conditions following radiothorium treatments, X-ray therapy
- Conditions following laminectomy
- Skin lesions (infections, inflammatory processes, naevi)
- Tumescences at all stages (pre-/postoperative)
- Blood coagulation diseases.

Do not apply ultrasound or simultaneous therapy close to the brain, spinal cord and eyes!

2 Controls and Indicators

As its LCD is divided in different function fields, **PHYSIOMED-Expert** allows for clear and easy operation.

The plastic housing and the front panel protect the electronic components and simplify cleaning.

Safety-related components are continuously monitored by the microprocessor, erroneously initiated operating steps are suppressed, a self-test routine is performed after switching on and possible malfunctions are displayed. For safety reasons, the stimulation current output is automatically cut off in case of malfunction.

2.1 Function of Controls and Indicators

In the following section we will introduce the individual controls of **PHYSIOMED-Expert**. The numbers in angle brackets refer to the *Instrument Overview* at the beginning of this manual.

2.1.1 Mains Module <1>



The **mains module <1>** with mains supply, fuses and mains switch is situated at the rear side of the instrument.

For **mains supply** do only use the mains cable provided by the manufacturer.

PHYSIOMED-Expert is switched on and off using the **integrated mains switch**. After switching on, a self-test is automatically carried out by the instrument (cf. *Notes on Operation* on page 26).

Set the Line Voltage

After replacing the fuses, you can run the instrument with 230 V as well as 115 V simply by using the rotatable fuse carrier at the **mains module <1>** (refer to section *Technical Data* on page 56). The fuses are situated under the cover of the **mains module <1>** in a fuse carrier.

Replace 1 A fuses with 2 A fuses, turn the fuse carrier by 180° and insert it again, so that the “red window” of the **mains module <1>** reads “115 V”, after the cover has been closed again.

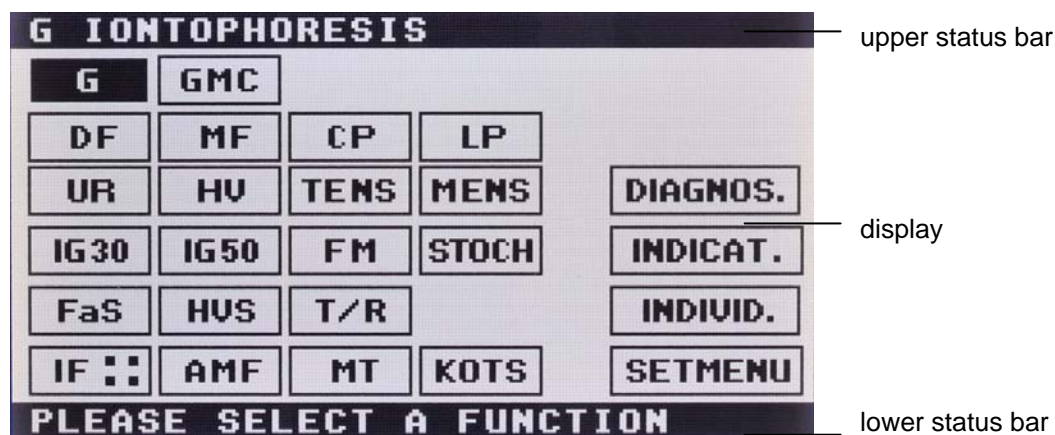
Warning Do run the instrument only with the indicated line voltage!



2.1.2 Upper Status Bar<2>

The **upper status bar <2>** shows indications or some of the corresponding parameters selected. For example: **G IONTOPHORESIS**.

2.1.3 Display <3>

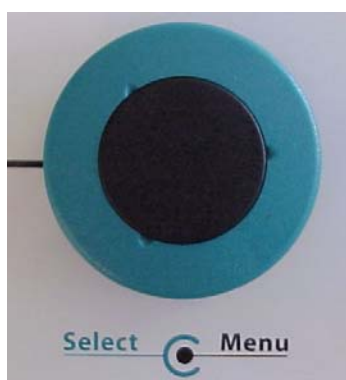


On the **display <3>**, you can select all of the instrument's menus and parameters on different levels except for the intensity. The selection is carried out with the **data selector <5>**.

2.1.4 Lower Status Bar<4>

In the **lower status bar<4>**, messages and prompts are issued, e.g.: **PLEASE SELECT A FUNCTION**.

2.1.5 Data Selector <5>

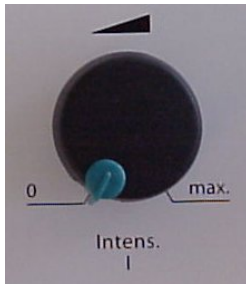


Use the **data selector <5>** to select the therapy parameters and to operate the instrument by means of the cursor. After switching on the instrument, the cursor is located at the current mode **G** of the **display <3>**.

You can move the cursor to the other menu items by turning the selector to the right or left. To select a menu, simply press the selector.

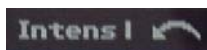
To select a parameter, move the cursor to the respective field by turning the selector. After pressing the selector, the cursor will start flashing. You will then be able to select the parameters by turning the selector and confirm the selected value by pressing the selector again (cursor stops flashing). The modified values are displayed in the **upper status bar <2>** or at the respective position of the **display <3>**.

2.1.6 Intensity Control Circuit I <6>



The **intensity control circuit I <6>** serves to set the intensity in circuit I in steps of 0.5 mA. When turning up the intensity of **intensity control circuit I <6>** or **intensity control circuit II <8>**, the associated therapy timer in the **display <3>** will be started as well.

Whenever you have to turn down the **intensity control circuit I** to "0", the following turn-down signal is displayed in the **lower status bar <4>**:



Automatic output current switch-off

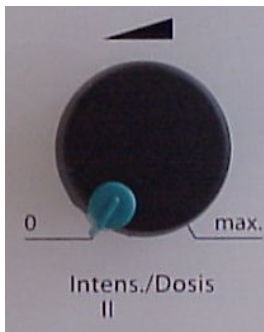
PHYSIOMED-Expert disposes of an **automatic output current switch-off** activated in case the current flow of the electrodes is interrupted (electrode falls off, plug is disconnected from patient lead etc.). The message **CHECK ELECTRODES I** will appear in the **lower status bar<4>** and the current will be automatically turned down to a minimum basic current in circuit I. After eliminating the error, the current in circuit I will automatically be surged to the previously set value and the message will disappear.

2.1.7 Pulse Indicator Circuit I <7>



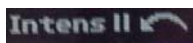
The **pulse indicator circuit I <7>** serves to visually monitor the current modes and intensities of **circuit I**. It flashes whenever a pulse is generated in circuit I by the processor, even in case of 0 intensity. It will stop flashing however when the intensity is automatically reduced by the therapy timer. After turning down the intensity of **circuit I** to 0 with the **intensity control circuit I <6>** the indicator will start flashing again. When changing the polarity of monophasic currents in circuit I (**display <3>**) the indicator will show how the intensity increases or decreases automatically.

2.1.8 Intensity Control Circuit II <8>



The **intensity control circuit II <8>** serves to set the current intensity in circuit II in steps of 0.5 mA. When turning up one of the two **intensity controls circuit I <6>** or **circuit II <8>**, the associated therapy timer on the **display <3>** will be started as well.

Every time you have to turn down the **intensity control circuit II** to 0, the following message will be displayed in the **lower status bar<4>**:



Automatic output current switch-off

PHYSIOMED-Expert disposes of an **automatic output current switch-off** activated in case the current flow of the electrodes is interrupted (electrode falls off, plug is disconnected from patient lead etc.). The message **CHECK ELECTRODES II** will appear in the **lower status bar<4>** and the current will be automatically turned down to a minimum basic current in circuit II. After eliminating the error, the current in circuit II will automatically be turned up to the previously set value and the message will disappear.

2.1.9 Pulse Indicator Circuit II <9>



The **pulse indicator circuit II <9>** serves to visually monitor the current modes and intensities of **circuit II**. It flashes whenever a pulse is generated in circuit I by the processor, even in case of 0 intensity. It will stop flashing, however, when the intensity is automatically reduced by the therapy timer. After turning down the intensity of **circuit I** to zero with the **intensity control circuit II <8>**, the indicator will start flashing again.

Note



Due to safety reasons increasing the ultrasound dose after the ultrasound has coupled (marker appears in the **upper status bar <2>**) is only possible after prior turning down the dose with **intensity control circuit II/dose <8>**.

2.1.10 Patient Current Indicator <10>



The diode at the left side of the symbol is attributed to circuit I, the diode at the right to circuit II. The flashing of the indicators depends on the resistance in the two circuits.

In most cases the diodes start flashing exactly at the moment when the patient starts to have a clear sensation of the current in the corresponding circuit.

If the indicator does not flash during treatment, you have to carry out a self-test routine and observe whether or not the indicator flashes. If the indicator still does not flash during treatment after the check, the accessories of the corresponding circuit should be checked and replaced if necessary.

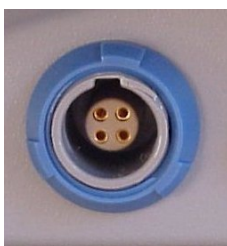
2.1.11 Output Indicator <11>



The indicator tells you to be cautious when handling the electrodes:

Warning! The **patient lead connector <12>** is under voltage! Take care that the electrodes are by no means touched after the current is turned up!

2.1.12 Patient Lead Connector <12>



The **patient lead connector <12>** serves to plug in the patient lead. You can plug plate electrodes, adhesive electrodes or other types of electrodes into the patient lead.

Patient Lead - Mode(s) of Attachment

The colours of the connectors facilitate easy and correct attachment of the electrodes to the two circuits and to their polarity.

Colour of the inner circle:
red = circuit I, blue = circuit II

Colour of the outer circle:
red = anode (+), blue = cathode (-)

cathode (-)
circuit I anode (+)
circuit II

anode (+)
circuit I cathode (-)
circuit II



Type BF component, not connected to protective ground wire.

Warning Take care that the electrodes are by no means touched after the current is turned up!



2.1.13 Manual Release Key Socket <13>



The **manual release key socket <13>** serves to connect a manual release key for manually triggering the current pulse. The use of a manual release key may be appropriate when applying the current modes FaS, HVS, T/R, MT and KOTS. To activate it, the function display must be at the following position:



The manual release key can be used as a **therapy pause button** for all other current modes. When pressing the release key, the current is switched off immediately. The following symbol appears on the **display <3>** after pressing the therapy pause button:



You can turn up the current only after setting the **intensity control circuit I <6>** and/or **intensity control circuit II/dose <8>** to zero. The therapy time is interrupted as long as the unit is standing by.

2.1.14 SIM Socket<14>



The **SIM socket <14>** serves to connect to an ultrasound therapy unit **PHYSIOSON-Expert** (see also *Simultaneous Therapy* on page 53).

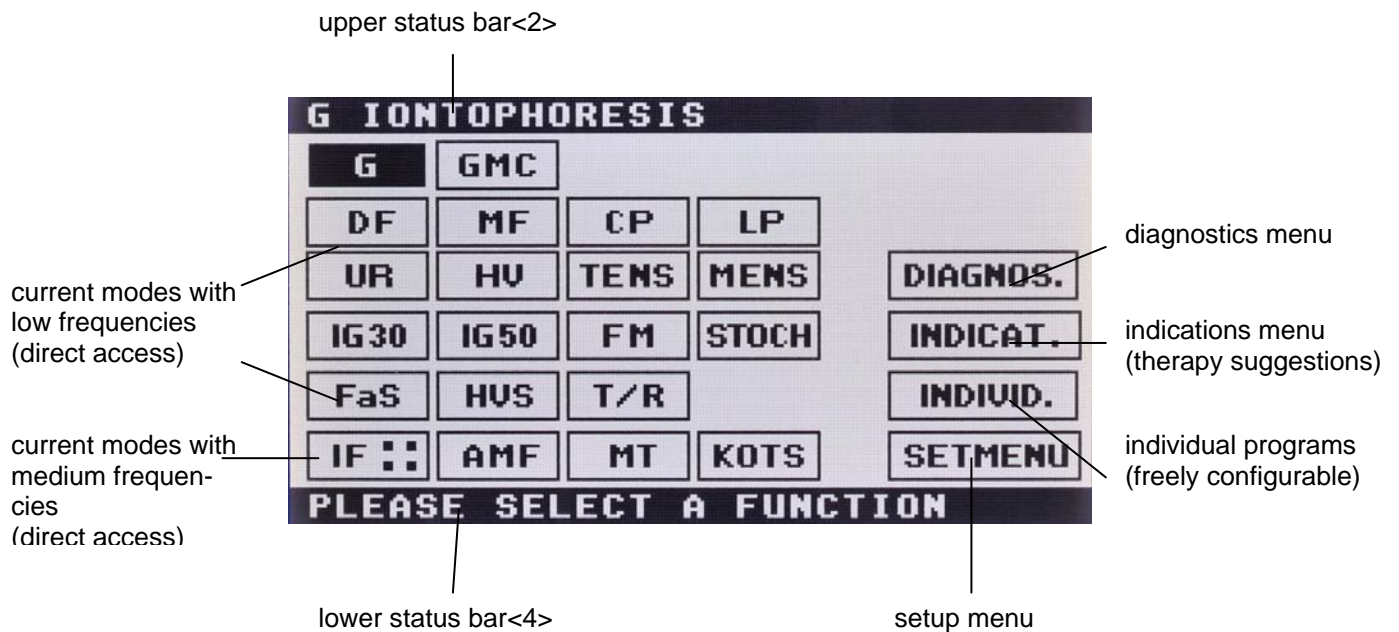
2.1.15 VAC Socket <15>



The **VAC socket <15>** serves to connect to a vacuum application unit **PHYSIOVAC-Expert** (also see *Connecting other Units* on page 64).

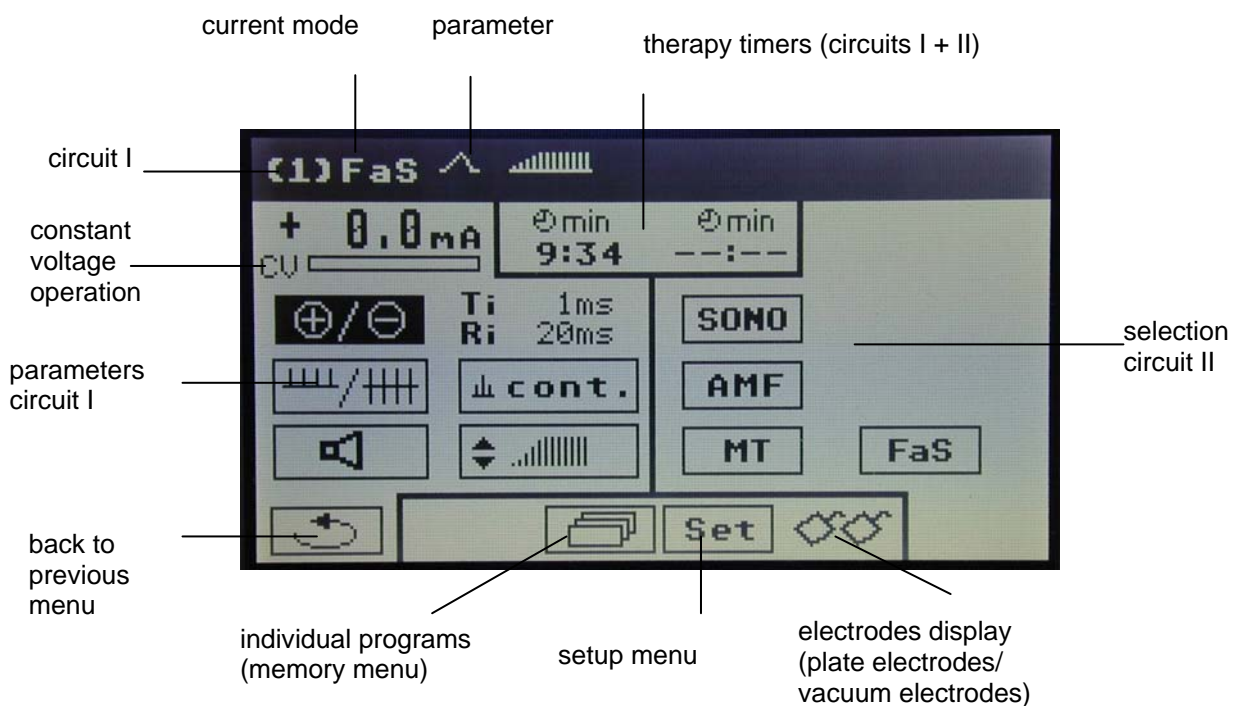
2.2 Overview of Parameters

2.2.1 Start Menu (1st level)



2.2.2 Example Menu (2nd level)

Current mode **FaS**



2.3 Operation

Selecting a function (e.g. the current mode **G**) from the start menu (level 1) will lead you to level 2 of the menu. Here you can set the desired parameters for the selected current mode.

The following functions are available on level 2:



Memory menu; individual programs (single treatments or current modes) can be memorised.



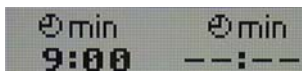
Display electrodes: Indicates whether the current is released via plate electrodes (this symbol) or via vacuum electrodes. The vacuum electrodes are enabled automatically when switching on the vacuum device. When the vacuum device is switched off, the current is released via plate electrodes (switching is slightly delayed).



Setup menu (settings)



Back to level 1



Therapy timer with selected therapy time; the therapy current will be reduced to 0 and an acoustic signal will be issued every 10 seconds after the countdown. There is one timer for each circuit.

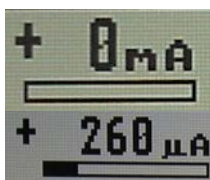
The parameters of the menus **DIAGNOS.**, **INDICAT.**, **INDIVID.** and **SETUP** will be discussed later.

2.3.1 Parameters for Circuit I

The following paragraph will give you an overview of the meaning of the symbols in the menus for the individual current modes in circuit I.

In General

The symbols below apply for **all current modes with low frequencies**:



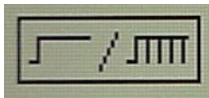
Intensity display circuit I (mA), to be set with **intensity control I <6>**. The sign (plus/minus) signifies the polarity of the red plug of circuit I.

Current is measured in μA for current modes **GMC** and **MENS** ($1,000 \mu\text{A} = 1.000 \text{ mA}$).

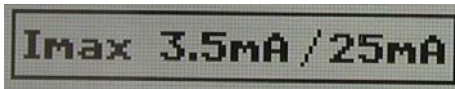


Exchange of polarity of the two electrodes; the sign (plus/minus) of the intensity display will be changed respectively.

Current Modes **G** **GMC**



Switching from galvanic current to *medium-frequency interrupted direct current*. The current setting is displayed in the upper status bar.



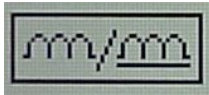
Toggling intensity ranges (0 – 3.5 mA or 0 – 25 mA). The current setting is displayed in the upper status bar (only for **G**).

Note



The maximum intensity of current mode **GMC** is so small that it is hardly perceptible. Its energy is not sufficient to light **Patient current indicator <10>** and **Output indicator <11>**. The displays remain dark therefore.

Current Modes **DF**, **MF**, **CP**, **LP**



Switching in a *galvanic basis* (5%).

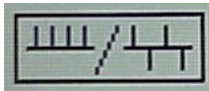
The current setting is displayed in the upper status bar.

Current Modes **UR**, **IG 30**, **IG 50**, **FM**, **STOCH**



Switching from monophasic to biphasic pulse emission. The current setting is displayed in the upper status bar.

Current Modes **HV**, **TENS**



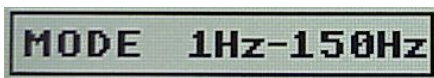
Switching from monophasic to biphasic pulse emission. The current setting is displayed in the upper status bar.



Pulse time (possible values: 40 µs – 400 µs)



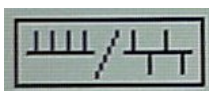
Burst frequency (possible values: OFF; 1 – 10 Hz, pulse ratios 1:1, 2:1, 1:2)



Frequency bands (70 – 150 Hz or 1 – 150 Hz) or fixed frequency (1 – 200 Hz).

The currently active frequency is displayed in the upper status bar.

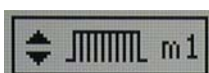
Current Mode **MENS**



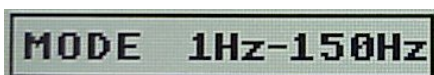
Switching from monophasic to biphasic pulse emission. The current setting is displayed in the upper status bar.



Burst frequency (possible values: Continuous; frequency band 0 – 15 Hz with pulse ratios 1:1, 1:2, 2:1; or selectable burst frequency 0.1 – 15 Hz with pulse ratios 1:1, 1:2, 2:1)



Burst shape (selectable: m1: rectangular, m2/m3/m4: triangular; m5: exponential)



Frequency bands (50 – 300 Hz, 50 – 200 Hz, 200 – 300 Hz; or fixed frequency 10 Hz; or selectable 50 – 300 Hz).

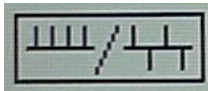
The currently selected frequency is displayed in the upper status bar.

Note



The maximum intensity of current mode **MENS** is so small that it is hardly perceptible. Its energy is not sufficient to light **Patient current indicator <10>** and **Output indicator <11>**. The displays remain dark therefore.

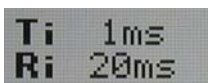
Current Mode **FaS**



Switching from monophasic to biphasic pulse emission. The current setting is displayed in the upper status bar.



Acoustic signal, makes every current pulse audible



Ti: Pulse time, possible values: 0,1 – 10 ms
Ri: Release time, possible values: 10 – 250 ms
Pulse shape (triangle, rectangle)

Basic settings: T = 1ms, R = 20 ms, triangular pulse



Relation contraction (*Tension*, 1 s) / pause (*Release*, 1 s), possible values T = 1 – 60 s, R = 1 – 60; manual release key (only if R > 1s)



Ramp (4 settings m_1 to m_4) with different rise times. The current setting is displayed in the upper status bar.

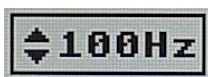
Current Mode **HVS**



Switching from monophasic to biphasic pulses. The current setting is displayed in the upper status bar.



Acoustic signal, makes every current pulse audible.



Frequency (possible values: 2 – 200 Hz)



Relation contraction (*Tension*, 1 s) / pause (*Release*, 1 s), possible values T = 1 – 60 s, R = 1 – 60; manual release key (only if R > 1s)



Ramp (4 settings m_1 to m_4) with different rise times. The current setting is displayed in the upper status bar.

Current Mode **T/R**



Pulse time (possible values: 1s – 0.1 ms)

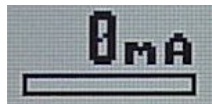


Release time (possible values: 7 s to 1 ms; manual release key)



Pulse shapes (square-wave pulse r_1 , trapezoidal pulses t_1 – t_3 , triangular pulses d_1 – d_3 , exponential pulse e_1). The current setting is displayed in the upper status bar.

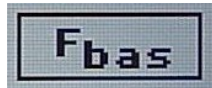
Current Mode **IF**



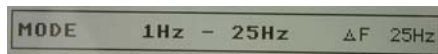
Intensity display circuit I / II (mA), to be set with **intensity control I <6>** and **intensity control II <8>**.



Vector function (dynamic function) ON/OFF



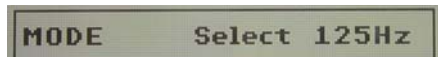
Basic frequency (range: 2.0 to 9.5 kHz)



Frequency bands: 4 fixed,



one free programmable,



fixed frequency (Select 1 – 250 Hz)



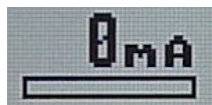
Interference vector display

Note



The current mode IF requires both circuit I and II simultaneously. You cannot select any additional therapy for circuit II.

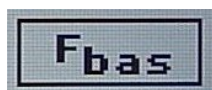
Current Mode **AMF**



Intensity display for circuit I, (mA), to be set with **intensity control I <6>**

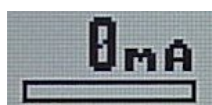


5 pre-set frequency bands,
fixed frequency (SELECT 0 – 250 Hz)



Basic frequency (possible values: 2.0 – 9.5 kHz)

Current Modes **MT, KOTS**



Intensity display circuit I, to be set with **intensity control I <6>**



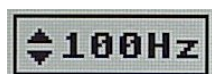
Tension time (possible values: 1 to 60 s in steps of 1s;
manual release key (only if R > 1s)



Release time (possible values: 1 to 60 s in steps of 1s)



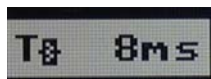
Ramp (4 settings m_1 to m_4) with different rise times. The current setting is displayed in the upper status bar.



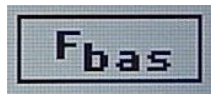
Modulation frequency (selectable: 0 – 125 Hz for **MT**, 0 – 95 Hz for **KOTS**)



Pulse shape (sine, triangle, rectangle)



Pulse length T
(possible values: 2 ms, 4 ms, 6 ms, 8 ms, 10 ms, auto)



Basic frequency (possible values: 2.0 – 9.5 kHz)



Acoustic signal, makes every current pulse audible

2.3.2 Parameters for i/t-diagnostics



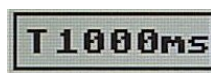
Exchange of polarity of the two electrodes;
the sign (plus/minus) of the intensity display will be changed respectively.



Acoustic signal, makes every current pulse audible



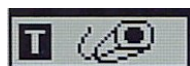
Pulse forms:
Select between rectangular pulse r1 and triangular pulse d1



Pulse time:
Selecting the pulse time (steps from 1000 ms – 0,1 ms)



Pause time:
Selecting the time between the pulses (steps from 2-5 s)



Trigger pulses with manual release key



Confirm muscular reaction



Delete stored values

2.3.3 Dual channel operation

For all current modes except **IF::** you can select additional current modes (dual channel operation) in circuit II .



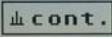



All current modes
can be applied in
both circuits

2.3.3.1 For all current modes except IF, GMC and MENS

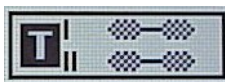
The current mode set in circuit I can also be selected with the same parameters in circuit II. AMF and MT can always be selected.

2.3.3.2 For the current modes FaS and HVS

The current mode set in circuit I can also be selected in circuit II, whereby individual parameters can be set independently for both circuits. With circuits I and II, stimulation can be either simultaneous or alternating. Carry out the following operational steps:

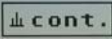



- (1) Select the desired current mode in both circuits.
- (2) With the **data selector <5>**, first click on the  selection field in circuit II. A further window will open.
- (3) In the new window, click on the  selection field, turn the selector at least one step to the right and confirm this.
- (4) In the same window, click on the  selection field and turn the selector to the left until the desired icon appears (e.g. for simultaneous stimulation).
- (5) Leave the window via the  button.

Simultaneous stimulation








Circuits I and II stimulate simultaneously with the same parameters. The polarity and ramp of the surge current can be freely selected in each circuit.

To adjust the threshold time and threshold interval, carry out the operational steps 1-5 described above, and then proceed as follows:

- (6) With the **data selector <5>**, first click on the  selection field in circuit I.
- (7) In the new window, click on the  selection field, turn the selector to the right and select the duration of the surge interval.
- (8) In the same window, click on the  selection field, turn the selector to the right and select the duration of the surge time.
- (9) Leave the window via the  button.

Simultaneous stimulation can also be initiated with the manual release key. Carry out the above-described operational steps 1-5, and then proceed as follows:

- (6a) With the **data selector <5>**, first click on the  selection field in circuit I.
- (7a) In the new window, click on the  selection field, turn the selector at least one step to the right and confirm this.
- (8a) In the same window, click on the  selection field and turn the selector to the left until the manual release key icon  appears.
- (9a) Leave the window via the  button.
- (10a) Insert the manual release key into the **manual release key socket <13>** at the rear of the equipment.

The length of the surge currents in circuits I and II is determined by the pressure on the manual release key.

If you have set up the manual release key in both circuits, then simultaneous stimulation will also follow.

Alternating stimulation (continuous transition between circuits I and II)

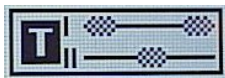
Circuits I and II provide alternating stimulation, one directly after the other.

A surge cycle follows, consisting of:

- (1) Surge current in circuit I in the selected length
- (2) No pause
- (3) Surge current in circuit II in the selected length
- (4) Pause for the selected length

To set the surge time and surge pause, carry out steps 1-9, described above.

Alternating stimulation can also be controlled with the manual release key. To do this, carry out steps 1-5 and 6a-10, described above.

Alternating stimulation (defined pauses between circuits I and II)

Circuits I and II provide alternating stimulation, with defined pauses between the surges in circuits I and II.

The surge times and surge pauses are adjusted in circuit I. To do this, carry out steps 1-9, described above.

Alternating stimulation can also be controlled with the manual release key. To do this, carry out steps 1-5 and 6a-10, described above.

2.3.3.3 For the MT and KOTS current modes

The current form set in circuit I can also be selected in circuit II, whereby individual parameters can be set independently for both circuits. With circuits I and II, stimulation can be either simultaneous or alternating, or controlled with the manual release key.

The settings are made as described on page 14, whereby **T** and **R** are not set via a separate window.

2.3.3.4 For the T/R current mode

The current mode set in circuit I can also be selected in circuit II, whereby all parameters can be set independently for both circuits. With circuits I and II, stimulation can be either simultaneous or alternating, or controlled with the manual release key.



To make adjustments, carry out the following operational steps:

- (1) Select the **T/R** current mode in both circuits.
A selection field appears in circuit II with which you can adjust the type of stimulation (simultaneous or alternating)

Simultaneous stimulation

Circuits I and II stimulate simultaneously with the same parameters. The setting is made via the selection fields **T**: Pulse time, **R**: pause duration and via the pulse form. Polarity can be freely selected in each circuit.

Simultaneous stimulation can also be initiated with the manual release key. To do this, carry out the following operational steps:

- (2) With the **data selector <5>**, click on the  selection field and turn fully to the right until the manual release key icon appears.
- (3) Click on the  selection field and choose the desired pulse duration for circuits I and II.
- (4) Insert the manual release key into the **manual release key socket <14>** at the rear of the equipment.

Alternating stimulation (continuous transition between circuits I and II)




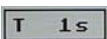

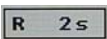


Circuits I and II provide alternating stimulation, one directly after the other (delay time: 50 ms).

A surge pulse cycle follows, consisting of:

- (1) Pulse in circuit I in the selected length and form
- (2) Delay 50 ms
- (3) Pulse in circuit II in the selected length and form
- (4) Pause for the selected length

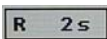




Pulse time **T**, pause time **R**, pulse form and polarity can be freely selected in each circuit.

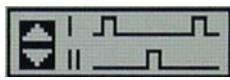
First, carry out operational step 1, as described above.

- (3) Click on the  selection field, turn the **data selector <5>** one step to the right and confirm this.
Additional selection fields for circuit II will appear.
- (4) Click on the  selection field in circuit I and choose the desired pulse duration for circuit I.
- (5) Click on the  selection field in circuit II and choose the desired pulse duration for circuit II.
- (6) Click on the  selection field and choose the desired pause duration.
- (7) To set the pulse forms and polarity in both circuits, click on the  and  selection fields.

Alternating stimulation can also be initiated with the manual release key.

First, carry out operational steps 1 and 2, as described above.



- (3a) With the **data selector <5>**, click on the  selection field and turn fully to the right until the manual release key icon appears.
- (4a) Click on the  selection field in circuit I and choose the desired pulse duration for circuit I.
- (5a) Click on the  selection field in circuit II and choose the desired pulse duration for circuit II.
- (6a) To set the pulse forms and polarity in both circuits, click on the  and  selection fields for each circuit.
- (7a) Insert the manual release key into the **manual release key socket <13>** at the rear of the equipment.

Alternating stimulation (defined pauses between circuits I and II)

Circuits I and II provide alternating stimulation, with defined pauses between the surge currents in circuits I and II.



Pulse time **T**, pause time **R**, pulse form and polarity can be freely selected in each circuit.

First, carry out operational steps 1 and 2, as described above.

- (3) Click on the **T 1s** selection field in circuit I and choose the desired pulse duration for circuit I.
- (4) Click on the **T 1s** selection field in circuit II and choose the desired pulse duration for circuit II.
- (5) Click on the **R 2s** selection field and choose the desired pause duration.
- (6) To set the pulse forms and polarity in both circuits, click on the  and  selection fields for each circuit.

Alternating stimulation can also be initiated with the manual release key.

First, carry out operational steps 1 and 2, as described above.

- (3a) With the **data selector <5>**, click on the **R 2s** selection field and turn fully to the right until the manual release key icon appears.
- (4a) Click on the **T 1s** selection field in circuit I and choose the desired pulse duration for circuit I.
- (5a) Click on the **T 1s** selection field in circuit II and choose the desired pulse duration for circuit II.
- (6a) To set the pulse forms and polarity in both circuits, click on the  and  selection fields for each circuit.
- (7a) Insert the manual release key into the **manual release key socket <13>** at the rear of the equipment.

2.4 Characterisation of the Individual Current Modes

Note

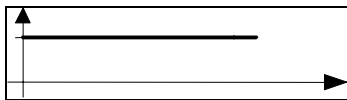


All current modes of the unit are emitted in the *constant current mode*, with the exception of simultaneous treatment (see page 53). Here, the device is automatically switched to a mixed mode consisting of *constant current* and *constant voltage mode* to avoid unpleasant current sensations when the contact between skin and transducer is interrupted.

2.4.1 Low-frequency Current Modes (LF)

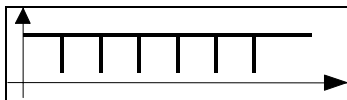
(G) Galvanisation

Direct current without any interruption or break



Variation:

Medium-frequency interrupted direct current (8 kHz; duty cycle 95%).



Application: Iontophoresis, basic therapy for paralysis and atrophy treatment, evoking hyperaemia

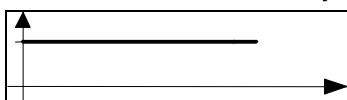
Note



You have to take special care when applying galvanic current. The moistened viscose covers must be well attached to the skin surface. The intensity must not exceed 0.1 mA/cm² of active electrode surface!

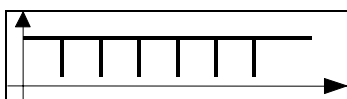
(GMC) Galvanisation with microcurrent

Direct current without any interruption or break



Variation:

Medium-frequency interrupted direct current (8 kHz; duty cycle 95%).



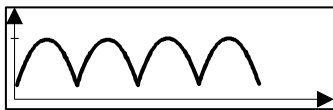
Application: Fine iontophoresis, trophic enhancement, pain treatment

(DF) Diadynamic Current *Diphassé Fixe*

acc. to Bernard

Fixed parameters	Adjustable
Pulse shape: sinusoidal half-waves	Galvanic basis (5%)
T = pulse time: 10 ms	
R = release time: 0 ms	
Frequency: 100 Hz	

Galvanic basis ON



OFF



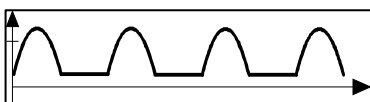
Application: Classic current for analgesia in case of neuralgia and chronic pains, sympathetic blockade

(MF) Diadynamic Current *Monophasé Fixe*

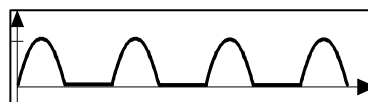
acc. to Bernhard

Fixed parameters	Adjustable
Pulse shape: sinusoidal half-waves	Galvanic basis (5%)
T = pulse time: 10 ms	
R = release time: 10 ms	
Frequency: 50 Hz	

Galvanic basis ON



OFF



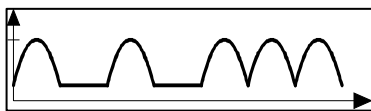
Application: Analgesia

(CP) Diadynamic Current *Modulé en Courtes Périodes*

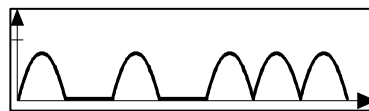
acc. to Bernard

Fixed parameters	Adjustable
Pulse shape: sinusoidal half-waves	Galvanic basis (5%)
T = pulse time: 10 ms	
R = release time: 10 ms	
Frequency: 100 Hz/50 Hz alternating every second	

Galvanic basis ON



OFF



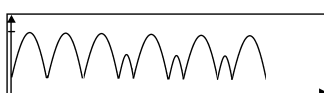
Application: Pain treatment, resorption enhancement

(LP) Diadynamic Current *Modulé en Longues Périodes*

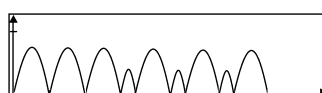
acc. to Bernard

Fixed parameters	Adjustable
Pulse shape: sinusoidal half-waves	Galvanic basis (5%)
T = pulse time: 10 ms	
R = release time: 10 ms	
MF basic current with second MF current alternately every 5 and 10 s.	

Galvanic basis ON



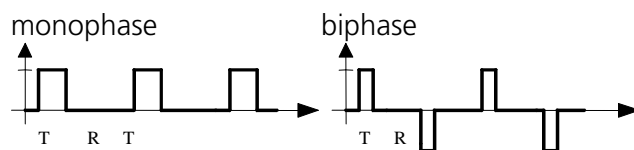
OFF



(UR) Ultrastimulation Current

acc. to Träbert

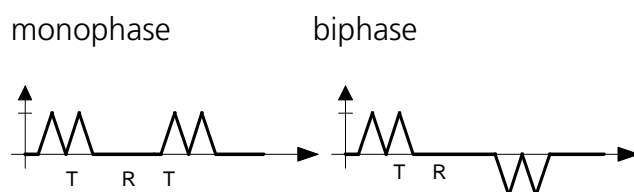
Fixed parameters	Adjustable
pulse shape: Square	Mono-/biphase
T = pulse time: 2 ms	
R = release time: 5 ms	
Stimulation frequency: about 143 Hz	



Application: Pains caused by hypertonic muscles, arthrosis and osteochondrosis.

(HV) High-Voltage Current

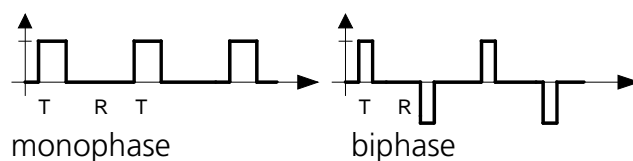
Fixed parameters	Adjustable
Pulse shape: twin triangular pulse	Mono-/biphase
T = pulse time: 0.1 ms	or adjustable 40 – 400 μ s
	Stimulation frequency: 2 Hz - 200 Hz (classic: 197 Hz)



Application: Pain treatment of various kinds for sensitive patients suffering from minimal hyperaemia.

(TENS) Transcutaneous Electric Nerve Stimulation

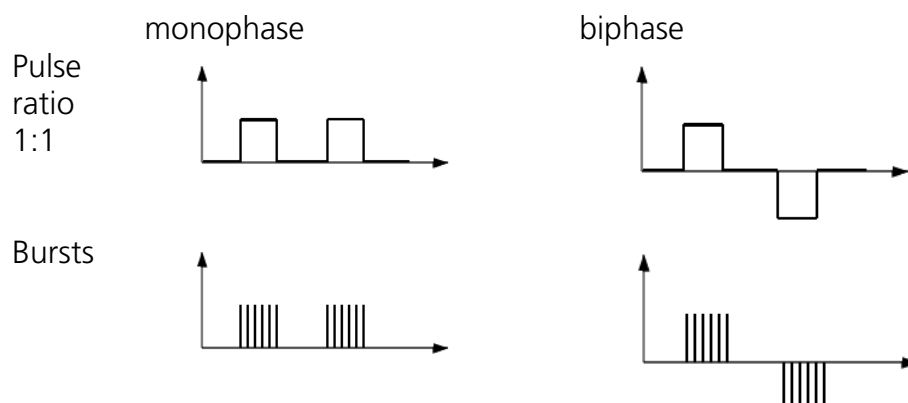
Fixed parameters	Adjustable
Pulse shape: square	Mono-/biphase
	T = pulse time: 40-400 μ s
	Bursts: 0-10 Hz
	Frequency bands: 1-150 Hz, 70-150 Hz
	Fixed frequency: 1-200 Hz



Application: Pain therapy for chronic neuralgia and myalgia.

(MENS) Electric Nerve Stimulation with Microcurrent

Fixed parameters	Adjustable
Pulse shape: square	Mono-/biphase
	Bursts: Continuous, Frequency bands 0 – 15 Hz with pulse ratios 1:1, 2:1, 1:2; or selectable 0.1 – 15.0 Hz with ratios 1:1, 2:2, 1:2
	Frequency bands: 50 – 200 Hz, 50 – 300 Hz, 200 – 300 Hz or fixed frequency: 10 Hz, 50 - 300 Hz
	Ramp (5 options)

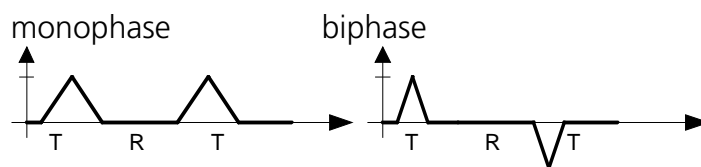


Application: Pain treatment (especially neuralgia and myalgia); trophic enhancement, improvement of healing and regeneration.

(IG 30) Pulse Galvanisation 30

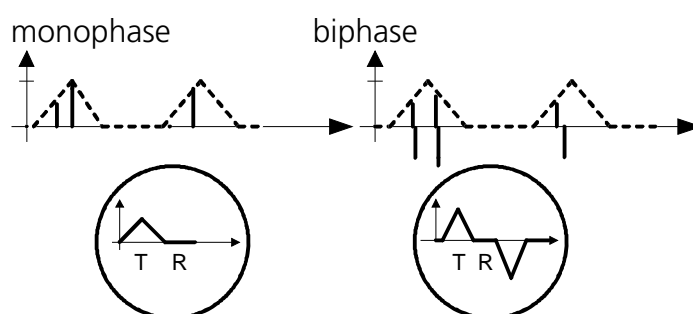
acc. to Jantsch

Fixed parameters	Adjustable
Pulse shape: triangular	Mono-/biphase
T = pulse time: 30 ms	
R = release time: 50 ms	
Stimulation frequency: about 12 Hz	

**Application:** Circulatory stimulation, analgesia**(IG 50) Pulse Galvanisation 50**

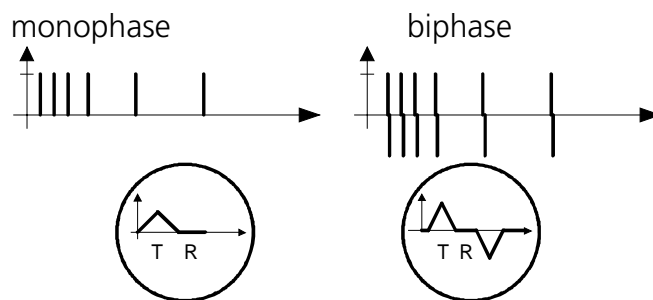
acc. to Jantsch

Fixed parameters	Adjustable
Pulse shape: triangular	Mono-/biphase
T = pulse time: 1 ms	
R = release time: 20 ms	
Surge time: 50 ms	
Surge pause: 70 ms	
Stimulation frequency: about 8 Hz	

**Application:** Shiver-inducing frequency for circulatory stimulation, analgesia, relaxing muscle tension, hematoma reduction.

(FM) Frequency-Modulated Current

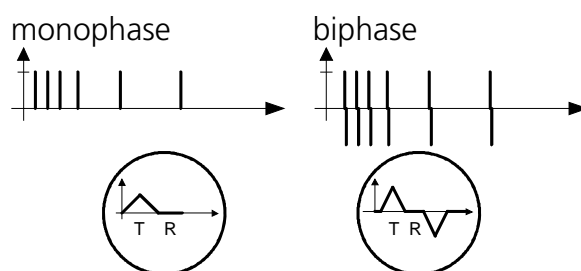
Fixed parameters	Adjustable
Pulse shape: triangular	Mono-/biphase
T = pulse time: 1 ms	
R = release time: 70 – 142 ms	
Stimulation frequency: 7 - 14 Hz	



Application: Shiver-inducing frequency with automatically altered stimulation cycles for circulatory stimulation, relaxing muscle tensions, analgesia, sports physiotherapy with little sensitive strain

(STOCH) Stochastic Current

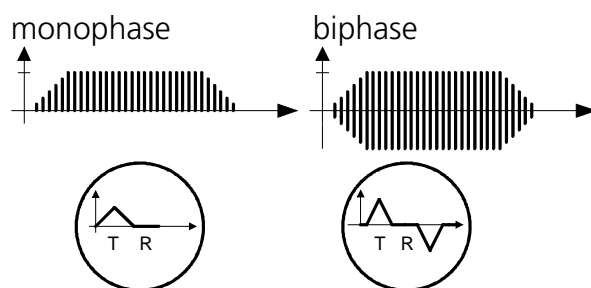
Fixed parameters	Adjustable
Pulse shape: triangular	Mono-/biphase
T = pulse time: 1 ms	
R = release time: 10 – 100 ms	
Stimulation frequency: 10 - 100 Hz	



Application: Stimulation current with random pulse triggering. For circulatory stimulation and analgesia with minimal stimulus adaptation.

(FaS) Faradic Surge Current

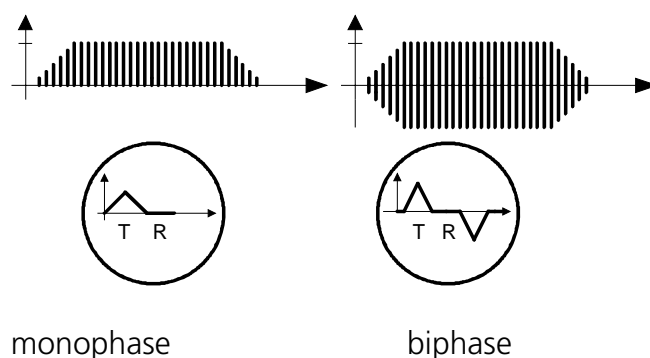
Fixed parameters	Adjustable
	T = pulse time: 0.1 - 10 ms (classic: 1 ms)
	Mono-/biphase
	Contraction time: 1 - 60 s; manual triggering (manual release key)
	Pulse shape: triangular, rectangular
	R = Pause: 1 - 60 s
	Ramp (surge time): 4 settings



Application: Treatment of muscle atrophies, intentional exercises acc. to Förster, electrogymnastics, muscle training in sports, co-ordination exercises

(HVS) High-voltage Current

Fixed parameters	Adjustable
Pulse shape: triangular twin pulse	Mono-/biphase
T = pulse time: 0.1 ms	Stimulation frequency: 2 Hz - 200 Hz (classic: 197 Hz)
	Contraction: 1 - 60 s; manual triggering (manual release key)
	Pause: 1 - 60 s
	Ramp (surge time): 4 settings



Application: Treatment of muscle atrophies, intentional exercises according to Förster, electrogymnastics, muscle training in sports, co-ordination exercises

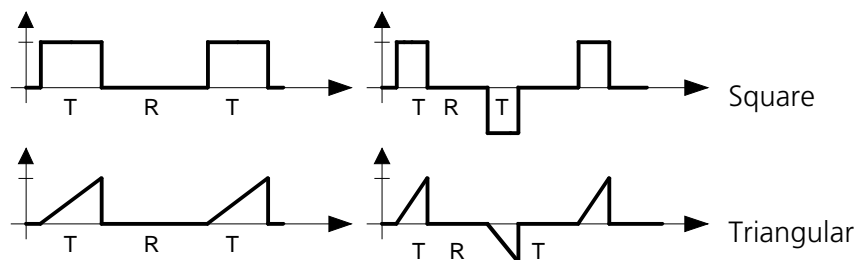
(T/R) Pulses with Adjustable Parameters

Fixed parameters	Adjustable
	Mono-/biphase
	T = pulse time: 0.1 - 1000 ms
	R = release time: 1 ms - 7 s, manual triggering (manual release key). The pulse time cannot exceed the release time.
	Pulse shapes: Square, 3 trapezoidal, triangular, exponential pulse

Example

monophase

biphase

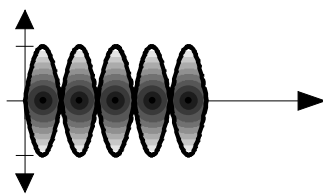


Application: Treatment of peripheral paralysis, selective muscle stimulation

2.4.2 Medium-Frequency Currents

(IF) Classic Interference Current

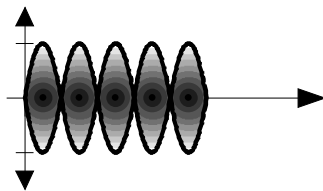
Fixed parameters	Adjustable
Sinusoidal waves	Vector function (dynamic function) F_{bas} = basic frequency: 2.0 - 9.5 kHz MODE = Modulation frequencies: Frequency bands: pre-set 1 - 25 Hz, 1 - 50 Hz, 1 - 250 Hz, 100 - 250 Hz or any other Select: fixed frequency: 0 - 250 Hz



Application: According to choice of parameters: pain therapy, circulatory stimulation, detonisation a. o.

(AMF) Amplitude-Modulated Medium-frequency Current

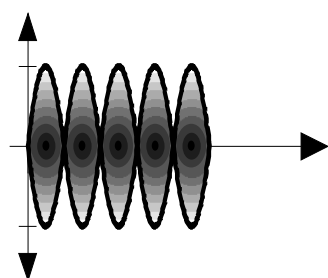
Fixed parameters	Adjustable
Sinusoidal waves	F_{bas} = Basic frequency: 2.0 - 9.5 kHz MODE = Modulation frequencies: Frequency bands: pre-set 0.1 - 1 Hz, 1 - 25 Hz, 1 - 50 Hz, 1 - 250 Hz, 100 - 250 Hz or any other Select: fixed frequency: 0 - 250 Hz



Application: According to choice of parameters: pain therapy, circulatory stimulation, detonisation a. o.

(MT) Medium-Frequency Muscle Training

Fixed parameters	Adjustable
Sinusoidal waves	<p>T = Contraction 1 – 60 s; manual triggering (manual release key)</p> <p>R = release time between contractions 0 – 60 s</p> <p>Ramp (surge time): 4 modes</p> <p>Modulation frequencies: 0 - 125 Hz</p> <p>F_{bas} = Basic frequency: 2.0 - 9.5 kHz</p>

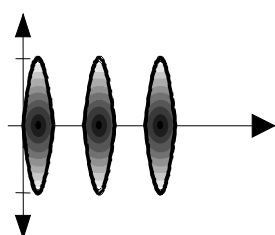


Application: Muscle training

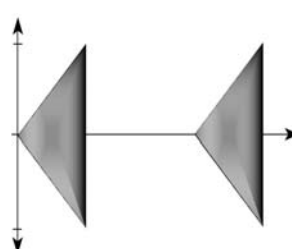
KOTS Medium-Frequency Muscle Training

according to Kots

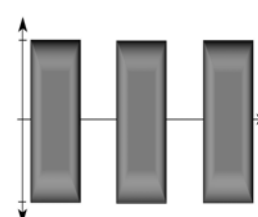
Fixed parameters	Adjustable
	<p>T = Contraction 1 – 60 s; manual triggering (manual release key)</p> <p>R = release time between contractions 0 – 60 s</p> <p>T = pulse time: 2 ms, 4 ms, 6 ms, 8 ms, 10 ms; auto</p> <p>Pulse shape: sine, triangle, rectangle</p>
R = release time: 10 ms	<p>Ramp (surge time): 4 modes</p> <p>Modulation frequencies: 0 – 95 Hz</p> <p>F_{bas} = Basic frequency: 2.0 - 9.5 kHz</p>



Sine



Triangle



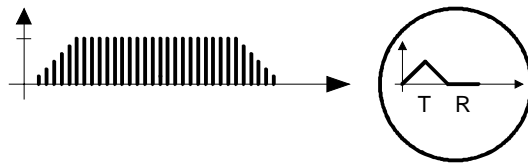
Rectangle

Application: Muscle training

2.4.3 Current Modes of the Diagnostics Menu

Faradic Excitability Test

Neofaradic current



Triangular pulses

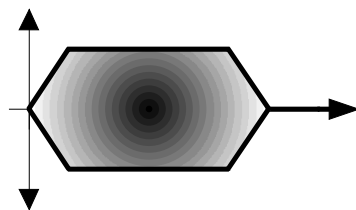
Pulse time $T = 1 \text{ ms}$

Release time $R = 20 \text{ ms}$

Stimulation frequency: 48 Hz

Medium-frequency Test acc. to Lange

Medium-frequency pulse

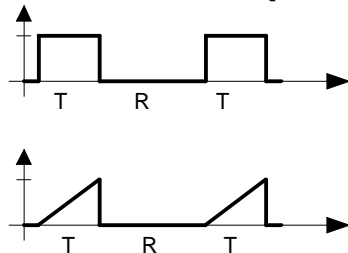


Pulse time $T = 300 \text{ ms}$

Surge time = 20 ms

Basic frequency: 4 kHz

Accommodation Quotient

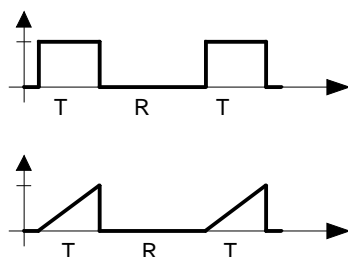


Pulse time T : 1000 ms, 500 ms

Release time R : 2 s, 3 s, 4 s, 5 s, manual

Pulse shape: square, triangular

Rheobase /

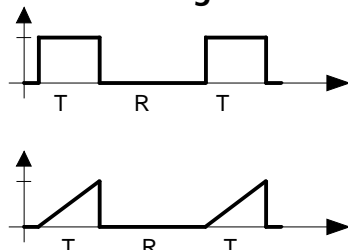


Pulse shape: square

Pulse time T : 1000 ms, 500 ms (rheobase)
0.1 – 1000 ms (chronaxy)

Release time R : 2 s, 3 s, 4 s, 5 s, manual

I/T Curve Diagnosis



Pulse shape: square, triangular

Pulse time T : 0.1 – 1000 ms

Release time R : 2 s, 3 s, 4 s, 5 s, manual

3 Notes on Operation

3.1 Connection and Start-up

Connecting the unit

- (7) Check whether the operating voltage of the device (see red window in the **mains module** <1>) and the line voltage correspond.
- (8) Plug the supplied mains lead firmly into the rear panel of the device (**mains module** <1>) and connect it to the socket. A safe connection is established via a grounding socket outlet with protective wire.

3.2 Device Start-up

- (1) Make sure that the instrument is switched off.
- (2) Turn both **intensity control circuit I** <6> and **intensity control circuit II** <8> to 0.
- (3) Plug the patient lead into the **patient lead connector** <12>.
- (4) Switch on the device with the mains switch (**mains module** <1>).
The instrument will carry out an automatic self-test routine during which all functions and output values are checked.
An audible signal is issued.

The instrument is ready now. You are in the start menu.

Warning Take care that the electrodes are by no means touched after the current is turned up!



3.3 Self-test routine

- (1) Turn both **intensity control circuit I** <6> and **intensity control circuit II** <8> to 0.
- (2) Switch the device off and on with the mains switch (**mains module** <1>).
The instrument will carry out an automatic self-test routine during which all functions and output values are checked.
An audible signal is issued.
- (3) The instrument is ready now. You are in the start menu.

3.4 Instrument Errors

If a functional error is detected during the automatic self-test routine or during operation, a corresponding note will be displayed on the LCD. A numeric error code will be shown, e.g. ERROR 10. The instrument will be switched off; stimulation current output is cut off as well.

The LCD shows:



These error codes simplify localising and eliminating errors.

Switch off the instrument and switch it on again. If the error code is still displayed after several runs through the self-test routine, contact your service partner.

Note

Random instrument errors may conceivably occur as the result of harmless spikes in the power line.

4 Stimulation Current Therapy

This chapter provides you with general information on stimulation current therapy and notes on attaching the electrodes. Moreover, both peculiarities and operating steps are described for different modes of treatment with **PHYSIOMED-Expert** using low-frequency currents (page 36) and medium-frequency currents (page 41).

Warning



Always switch on the equipment BEFORE you attach the electrodes to the patient!

Only switch off the equipment off AFTER you have removed the electrodes from the patient! Take care that the electrodes are by no means touched after the current is turned up!

4.1 General Information

PHYSIOMED-Expert offers you three possibilities to start a stimulation current therapy:

- **direct start** via the **stimulation current menu** (pages 36 and 41).
- starting via the **indications menu** with its treatment proposals for a multitude of applications (page 54).
- starting via **individual programs** (created by yourself, page 58).

4.2 Safety Precautions when Attaching Electrodes

Please observe the following safety precautions when attaching electrodes:

- Never apply the electrodes to skin areas which have injuries, abrasions or inflammations!
- Always use the largest electrodes possible!
- Insert the leading edge of the plate electrodes as deeply as possible into the sponge bags so that they are completely immersed in them, and can no longer touch the skin!
- Ensure that the electrodes are placed in position with the **wider side of the sponge bags in contact with the skin!**
- Attach the electrodes so that their entire area lies on the patient's body, and cannot slip off!
- Regularly remove any deposits which may occur through body fat or water residue from the plate electrodes and the metal contacts of the vacuum electrodes! To do this, use water and neutral soap, or in more stubborn cases, surgical spirits!
- Check the electrodes regularly and have any damaged parts repaired or replaced!

4.3 Safety Precautions for Stimulation Current Intensity

Please observe the following safety precautions when adjusting the intensity of the stimulation current applied to the patient:

- Always bear in mind that the patient may display an altered sensitivity, and may therefore not be properly aware of the current strength.
- Be especially careful in measuring doses for blonde, light-skinned patients, and for thin-skinned patients.
- Explain to patients that if they experience unpleasant or even burning sensations under one of the electrodes, they must point this out. (Where available, give the patient the release button for interrupting the therapy.)
- **Pay particular attention, when using current forms with a high galvanic component (G, DF, MF, CP, LP, UR, IG 30, T/R with pulse lengths above 50 ms and accompanied by pauses below 200 ms), that the recommended intensity of 0.1 mA/cm² of active electrode surface area is not exceeded.**
- If you use electrodes of various different sizes during a treatment, the smaller of the two electrodes, the so-called "active electrode", is always decisive when measuring the intensity.

4.3.1 Recommended Intensities

The maximum intensity to be applied depends on the type and size of the electrodes. Please observe the maximum intensities as specified here!

4.3.1.1 Plate Electrodes

Type	Size of Plate Electrodes (sponge bags; cm)	Effective Area (cm ²)	Maximum Intensity for Currents with High Galvanic Component
EF 10	4.0 x 3.0 (5.5 x 5,0)	10	1 mA
EF 50	8.0 x 6.0 (11.0 x 9,0)	50	5 mA
EF 100	12.0 x 9.0 (14.0 x 12,0)	100	10 mA
EF 200	17.0 x 11.0 (20.0 x 15,0)	200	20 mA

4.3.1.2 Vacuum Electrodes

Type	Diameter of Electrode (cm)	Effective Area (cm ²)	Maximum Intensity for Currents with High Galvanic Component
0	3.0	7	0.7 mA
1	6.0	20	2 mA
2	9.0	40	4 mA

4.4 Preparations and Attaching the Electrodes

To prepare the electrodes, proceed as follows:

- (1) Prior to attaching the electrodes, make sure that both **intensity control circuit I <6>** and **intensity control circuit II <8>** are turned down to 0!

Warning Take care that the electrodes are by no means touched after the current is turned up!



-
- (2) Plug the patient lead into the **patient lead connector <12>** with the guide rails facing upward.
 - (3) Plug the plate electrodes or junction lead for adhesive electrodes into the corresponding connectors of the patient lead (page 7).
Make sure that the polarity is correct.
 - (4) Prior to attaching the electrodes, check whether the patient's skin shows scars or lesions. Avoid such areas by all means!
 - (5) Select the size of the electrodes according to the area of treatment following the principle: Area of electrodes as small as necessary but as large as possible. A larger electrode area usually makes treatment for the patients more pleasant.
 - (6) Plug the plate electrodes into the well-moistened electrode covers and attach them to the patient. To moisten viscose covers use tap water or sodium chloride solution (1%). Make sure that the whole electrode area is fixed tightly to the skin with the padded side of the electrode cover.
If you use adhesive electrodes, attach them to the patient. Use only electrodes that stick well, i.e. with the whole area!

Warning It is not permissible to exceed an effective current density of 2 mAs/cm²!



Pay particular attention, when using current forms with a high galvanic component (G, DF, MF, CP, LP, UR, IG 30, T/R with pulse lengths above 50 ms and accompanied by pauses below 200 ms), that the recommended intensity of 0.1 mA/cm² of active electrode surface area is not exceeded.

If you use electrodes of various different sizes during a treatment, the smaller of the two electrodes, the so-called "active electrode", is always decisive when measuring the intensity.

For additional information on type, size and application of the electrodes, see the supplied therapy booklet *Introduction to Electrotherapy*.

4.4.1 Modes of attaching the electrodes

Bipolar

Here you must use two electrodes of equal size.

This is the most common mode especially for pain therapy and circulatory stimulation.

Unipolar

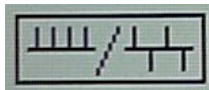
Preferably used when treating small areas, e.g. nerve and muscle stimulation points, especially on the hands or in the face.

This therapy mode includes using two electrodes of different size, with the bigger (indifferent) one being fixed proximally in most cases. The size of the indifferent electrode must be big enough not to stimulate any more (size = two to three times). A punctiform electrode is mostly used as small (different) electrode.

4.5 Therapy using low-frequency current modes

4.5.1 Monophase and biphasic current modes

The majority of low-frequency current modes for pain therapy, circulatory stimulation, detoxification and mobilisation can be applied in their basic monophase as well as biphasic mode. If this option exists, the following selection is displayed in the menu of the respective current mode:



Monophase current modes resemble direct current, i.e. every electrode has a defined polarity: + = anode (low-stimulation electrode)

- = cathode (high-stimulation electrode).

Biphasic current modes, however, have a continually alternating polarity, called *non-polarity*. The stimulation intensity of both electrodes is identical.

Many current modes are preferably applied in biphasic mode, as you can reduce the danger of burns even at high doses. Biphasic currents have a better tolerance, which has special significance for the treatment of sensitive patients.

4.5.2 Iontophoresis



The iontophoresis features the percutaneous diffusion of medicaments or therapeutic ointments into the body when using *galvanic current*.

It is important for the treatment to know the relation of ions of the respective medicament. Depending on the combination of the active agent molecules and their separation in positive and negative particles we speak of *cations* and *anions*. Ions migrate as follows:

cations to cathode
anions to anode.

Thus, the particles are named after the pole to which they migrate. The electric charge of the active agents in the medicaments is always named by the manufacturer.


Treatment Procedure

- (1) Use an alcoholic swab to remove cutaneous fat. Take care that there are no skin lesions in the area of treatment.
Preparing the skin with heat before the treatment will improve its receptiveness.
- (2) Apply the ointment, cover it with iontophoresis foil and put on the moistened viscose covers with the electrode inside.
- (3) Fix the electrode to the point of treatment. Moisten the viscose cover of the opposite electrode sufficiently with water and fix it as well.
- (4) Select the current mode **G** or **GMC** from the **display <3>**. Watch for correct polarity of the electrodes!
- (5) Set the therapy time.
- (6) If necessary, plug in the manual release key as therapy pause button.
- (7) Slowly turn up the intensity of circuit I with the **intensity control circuit I <6>**.
The therapy time elapses.

Warning Take care that the electrodes are by no means touched after the current is turned up!



-
- (8) After treatment,, an acoustic signal will be issued.
Turn the intensity down to 0.
 - (9) Remove the electrodes and rinse the viscose covers thoroughly.

Note  The diffused quantity of the agent directly depends on the size of the electrodes, the therapy time and the current intensity.
During galvanisation the maximum current intensity is 0.1 mA on 1 cm² of active electrode area.

The time of each treatment must always be chosen according to medicament and size of electrodes; one treatment typically lasts 10-30 minutes.

4.5.3 Pain Therapy, Hyperaemisation, Detonisation



The following current modes can be used for these modes of therapy:

G, GMC, DF, MF, CP, LP, UR, HV, TENS, MENS, IG 30, IG 50, FM, STOCH.

Note

Working with these current modes, you can always carry out an additional therapy by means of circuit II (see also *Dual channel operation* on page 14).

Treatment Procedure

- (1) Attach the electrodes to the respective stimulation points.
- (2) Select one of the above mentioned current modes from the **display <3>**, e.g. **STOCH**.
- (3) Select the variable parameters (e.g. frequency, biphasic, etc.).
- (4) Set the therapy time.
- (5) If necessary, plug in the manual release key as therapy pause button.
- (6) Slowly turn up the intensity of circuit I with the **intensity control circuit I <6>**. The therapy time elapses.

Warning

Take care that the electrodes are by no means touched after the current is turned up!

- (7) After treatment, an acoustic signal will be issued.
Turn the intensity down to 0.
- (8) Remove the electrodes.

4.5.4 Muscle Stimulation using Low-Frequency Currents

The low-frequency current modes provided for muscle stimulation are **FaS**, **HVS**, **T/R**.

FaS and HVS are usually applied in case of faradic excitable nervo-muscular systems. If, however, while testing the faradic excitability, it was noticed that the muscles can NOT be stimulated successfully any more, it is advisable to treat the beginning atrophy of the paralysed muscle with triangular pulses of the T/R. This way, the denerved muscles can be retained until re-innervation by stimulation according to the principle of selective muscle stimulation.

Note

Working with these current modes, you can always carry out an additional therapy by means of circuit II (see also *Dual channel operation* on page 14).

Treatment using automatic current triggering

- (1) Attach the electrodes to the respective stimulation points. Position the patient to enable free movement of the stimulation area.
- (2) Depending on the indication, select one of the current modes **FaS**, **HVS** or **T/R** from the **display <3>**.
- (3) If necessary, select the function biphas.
- (4) If desired, activate the acoustic signal.
- (5) Adapt the pulse time T or the frequency.
- (6) Set the tension time T and the release time R.
The release time R should be selected to give the nerve-muscle-unit sufficient time for recreation.
- (7) Select the ramp of the current rise (for **FaS** and **HVS**) or the mode of pulse (for **T/R**).
- (8) Set the therapy time.
- (9) If necessary, plug in the manual release key as therapy pause button.
- (10) Slowly turn up the intensity of the respective circuit (**intensity control circuit I <6>** or **intensity control II <8>**). The therapy time elapses.

Warning Take care that the electrodes are by no means touched after the current is turned up!

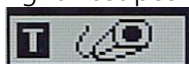


-
- (11) Signs of fatigue should make you stop the treatment (they may already occur after a few muscle contractions)!
 - (12) After treatment, an acoustic signal will be issued. Turn the intensity down to 0.
 - (13) Remove the electrodes.

Treatment with manual release key

Treatment with a manual release key is advisable for individual therapy methods in the field of sports, for intentional exercises according to Förster as well as for practising both co-ordination and nerve tracts. This is the great advantage of working with the manual release key.

- (1) Plug the manual release key into the **manual release key socket <14>** at the rear face of the instrument.
- (2) Apply the electrodes at the respective stimulation points. Position the patient to enable free movement of the stimulation area.
- (3) Depending on the indication, select one of the current modes **FaS**, **HVS** or **T/R** from the **display <3>**.
- (4) If necessary, select the function biphas.
- (5) Activate the acoustic signal if desired.
- (6) If necessary, adapt the pulse time T or the frequency.
- (7) When applying **FaS** or **HVS**, set the release time R to 1s and the tension time T to the left to the manual release key position (turn the release time to the rightmost position when applying T/R).



- (8) Set the therapy time.

- (9) Slowly turn up the intensity with depressed manual release key button (**intensity control circuit I <6>** or **intensity control circuit II <8>**) until the muscle contraction is sufficient. The therapy time elapses.

Warning

When using the manual release key, release a pulse each time you turn up the intensity!

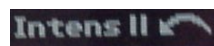
Warning

Take care that the electrodes are by no means touched after the current is turned up!

- (10) Release the button.
If the manual release key is pressed again, the current for **FaS** and **HVS** will rise automatically and will keep the set intensity as long as the manual release key is pressed. After releasing the button, the intensity will automatically be reduced slowly. Pressing the button for **T/R** will trigger a current pulse of the time T previously selected.
- (11) Signs of fatigue should stop the treatment (they may already occur after a few muscle contractions)!
- (12) After treatment, an acoustic signal will be issued. Turn the intensity down to 0.
- (13) Remove the electrodes.

Note

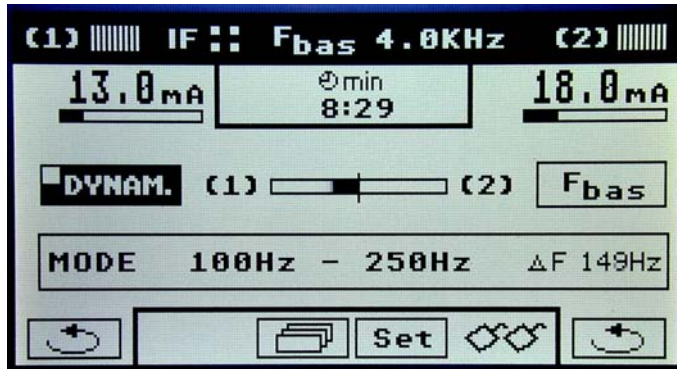
If the intensity (**intensity control circuit I <6>** or **intensity control circuit II <8>**) is turned up during the time of release, the following message will appear in the **lower status bar <4>**:



Slowly turn down the intensity of the respective circuit then. The message will disappear as soon as the previously set value is reached again.

4.6 Therapy using medium-frequency current modes

4.6.1 Therapy using classic interference current IF::



Treatment Procedure

- (1) Attach the electrodes to the stimulation points. Make sure that the four electrodes of the two circuits are fixed crosswise.
- (2) Select the current mode **IF** from the **display <3>**.
- (3) If necessary, select the vector function **DYNAM.**.
- (4) Depending on the indication, select a frequency band or a fixed frequency.
- (5) If necessary, alter the basic frequency.
- (6) Set the therapy time.
- (7) If necessary, plug in the manual release key as therapy pause button.
- (8) Slowly turn up the intensity in circuit I with the **intensity control circuit I <6>**. The therapy time elapses.

Warning Take care that the electrodes are by no means touched after the current is turned up!

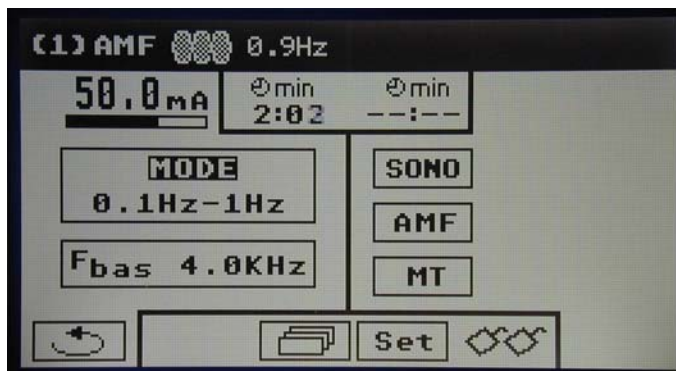


- (9) Slowly turn up the intensity in circuit II with the **intensity control circuit II <8>**. Make sure that the sensation of the current is the same for all electrodes.
- (10) After treatment, an acoustic signal will be issued. Turn the intensities of both circuits down to 0.
- (11) Remove the electrodes.

Note The current mode IF requires both circuits I and II simultaneously. You can not carry out an additional therapy with circuit II.



4.6.2 Pain Therapy, Hyperaemisation, Detonisation using AMF Current



Note



Working with these current modes, you can always carry out an additional therapy by means of circuit II (see also *Dual channel operation* on page 14).

Treatment Procedure

- (1) Attach the electrodes to the respective stimulation points.
- (2) Select the current mode **AMF** from the **display <3>**.
- (3) Depending on the indication, select a frequency band or a fixed frequency.
- (4) If necessary, alter the basic frequency.
- (5) Set the therapy time.
- (6) If necessary, plug in the manual release key as therapy pause button.
- (7) Slowly turn up the intensity of the respective circuit (**intensity control circuit I <6>** or **intensity control circuit II <8>**). The therapy time elapses.

Warning



Take care that the electrodes are by no means touched after the current is turned up!

- (8) After treatment, an acoustic signal will be issued.
Turn the intensity down to 0.
- (9) Remove the electrodes.

4.6.3 Muscle Stimulation using Medium-frequency Surge Currents



The medium-frequency surge currents intended for the surge current therapy are **MT** and **KOTS**. Both current modes are usually applied to faradic excitable nerve-muscle units.

Note



Working with these current modes, you can always carry out an additional therapy by means of circuit II (see also *Dual channel operation* on page 14).

Treatment Procedure using Automatic Surge Current

- (1) Attach the electrodes to the respective stimulation points. The position of the patient must enable a free movement of the stimulation area.
- (2) Depending on the indication, select one of the current modes **MT** or **KOTS**.
- (3) Set the tension time T and the release time R. The release time R should be long enough to give the nerve-muscle-unit enough recreation time.
- (4) Select the ramp of the current rise.
- (5) Select the modulation frequency.
- (6) If necessary, alter the basic frequency.
- (7) Activate the acoustic signal, if desired.
- (8) Set the therapy time.
- (9) If necessary, plug in the manual release key as therapy pause button.
- (10) Slowly turn up the intensity of the respective circuit (**intensity control circuit I <6>** or **intensity control circuit II <8>**). The therapy time elapses.

Warning



Take care that the electrodes are by no means touched after the current is turned up!

- (11) Signs of fatigue should stop the treatment (they may already occur after a few muscle contractions)!
- (12) After treatment, an acoustic signal will be issued.
Turn the intensity down to 0.
- (13) Remove the electrodes.

Treatment Procedure using Manual Release Key

Surge current treatment by manual release key is advisable for individual therapy methods in the field of sports, for intentional exercises according to Förster, as well as for practising both co-ordination and nerve tracts. This is where the manual trigger of the Surge current proves its value.

- (1) Plug the manual release key into the **manual release key socket <14>** at the rear face of the instrument.
- (2) Attach the electrodes to the respective stimulation points. The position of the patient must enable a free movement of the stimulation area.
- (3) Depending on the indication, select one of the current modes **MT** or **KOTS**.
- (4) Set the release time R to 1s and the tension time T to the left to the manual release key position.



- (5) Select the ramp of the current rise.
- (6) Select the frequency of modulation.
- (7) If necessary, alter the basic frequency.
- (8) Activate the acoustic signal, if desired.
- (9) Set the therapy time.
- (10) Slowly turn up the intensity with manual release key pressed (**intensity control circuit I <6>** or **intensity control circuit II <8>**) until the muscle contraction is sufficient. The therapy time elapses.

Warning Take care that the electrodes are by no means touched after the current is turned up!

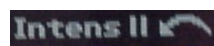
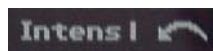


Warning When using the manual release key, release a pulse each time you turn up the intensity!



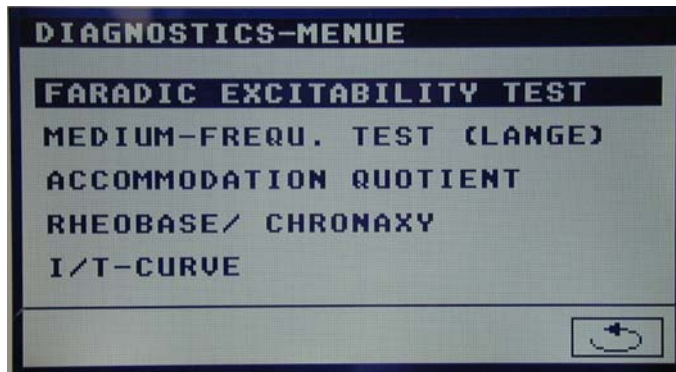
-
- (11) Release the button.
If the manual release key is pressed again, the current will increase automatically and will keep the set intensity as long as the manual release key is pressed. After releasing the button, the intensity will automatically be reduced in intervals.
 - (12) Signs of fatigue should stop the treatment (they may already occur after a few muscle contractions)!
 - (13) After treatment, an acoustic signal will be issued. Turn the intensity down to 0.
 - (14) Remove the electrodes.

Note If the intensity (**intensity control circuit I <6>** or **intensity control circuit II <8>**) is turned up during the time of release, the following message will appear in the **lower status bar <4>**:



Slowly turn down the intensity of the respective circuit then. The message will disappear as soon as the previously set value is reached again.

5 Diagnosis using Stimulation Current



5.1 Faradic Excitability Test

In case of paralysis or atrophy it is advisable to carry out a simple excitability test prior to a rather complicated I/T diagnosis. A still existing faradic excitability may, under certain conditions, make IT diagnosis unnecessary.

In case of degenerate nervo-muscular systems no muscle contraction is possible even when working with intensities above tolerance level. Slightly innervated muscles however are *faradic excitable*, i.e. they show a positive reaction to the test. Comparing the sides will show you that higher intensities must be applied on the afflicted side.

Procedure

- (1) Attach the electrodes to the respective stimulation points (bipolar or unipolar mode of attachment).
- (2) Select the menu **DIAGNOS.**
- (3) Select the menu **FARADIC EXCITABILITY TEST**.
- (4) Slowly turn up the intensity with the **intensity control circuit I <6>**. Watch whether the muscle shows any signs of tension.

Warning Take care that the electrodes are by no means touched after the current is turned up!



- (5) Confirm a reaction of the muscle by pressing **REACTION** or **NO REACTION**. The instrument will interpret your test result and will make suggestions for further procedure.
- (6) Turn the intensity down to 0.
- (7) Remove the electrodes.

5.2 Medium-frequency Test according to Lange

While a fully functional nerve-muscle system reacts to the medium-frequency stimulation, this is not the case for denervated muscles or a damaged muscle system. Normally, unipolar stimulation is directly carried out with a 1.5 cm² point electrode. It is recommended to compare sides.

In case of degenerate nervo-muscular systems no muscle contraction is possible whatsoever even when working with intensities above tolerance level. Slightly innervated muscles, however, show a positive reaction to the test. Comparing the sides will show you that higher intensities must be applied on the afflicted side.

Procedure

- (1) Attach the electrodes to the respective stimulation points (bipolar or unipolar mode of attachment).
- (2) Select the menu **DIAGNOS.**
- (3) Select the menu **MEDIUM-FREQU. TEST (LANGE)**.
- (4) Slowly turn up the intensity with the **intensity control circuit I <6>**. Keep watching whether the muscle shows any signs of tension.

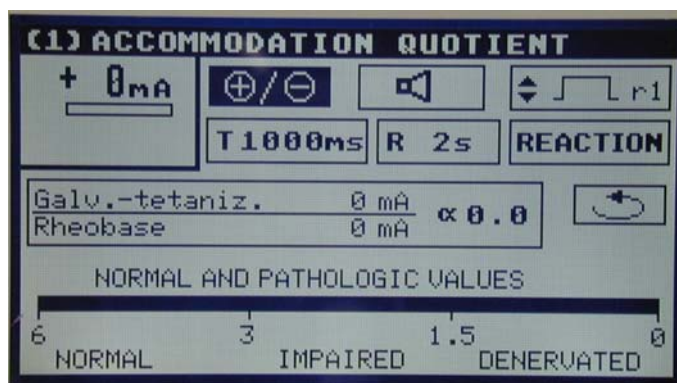
Warning Take care that the electrodes are by no means touched after the current is turned up!



- (5) Confirm a reaction of the muscle by pressing **REACTION** or **NO REACTION**. The instrument will interpret your test result and will make suggestions for further procedure.
- (6) Turn the intensity down to 0.
- (7) Remove the electrodes.

5.3 Accommodation Quotient

The *accommodation quotient* is the quotient of *Rheobase* and *galvano-tetanus-threshold*, i.e. of the intensities with square pulses (500 or 1000 ms) and triangle pulses (500 or 1000 ms) necessary to trigger a minimal contraction. It informs about the accommodation ability of the examined nerve-muscle unit.



Setting and interpreting the accommodation quotient with **PHYSIOMED-Expert** is carried out semi-automatically.

Procedure

- (1) Attach the electrodes to the respective stimulation points (bipolar or unipolar mode of attachment).
- (2) Select the menu **DIAGNOS**.
- (3) Select the menu **ACCOMODATION QUOTIENT**.
- (4) Activate the acoustic signal if desired.
- (5) Select the desired pulse time T (500 or 1000 ms).
- (6) Select the desired release time R (2-5 s, manual release key).
- (7) Move the cursor to the command button **REACTION**.
- (8) Slowly turn up the intensity with the **intensity control circuit I <6>** until the muscle shows signs of tension. Watch for the pauses between the pulses.

Warning When using the manual release key, release a pulse each time you turn up the intensity!



Warning Take care that the electrodes are by no means touched after the current is turned up!



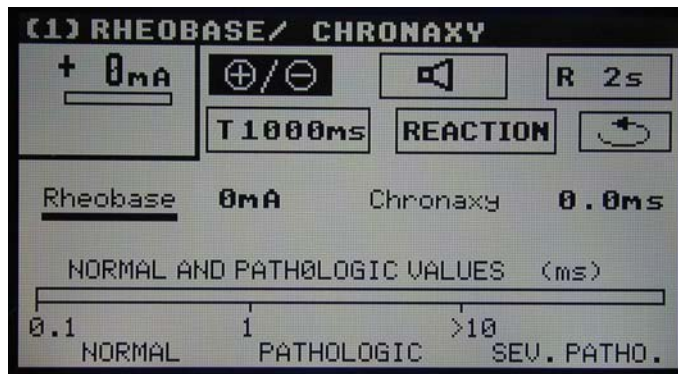
- (9) Press the button **REACTION** to confirm the intensity value. The respective intensity value will be saved. The pulse shape automatically changes to triangle. The pulse emission continues.



- (10) Slowly turn up the intensity again until the muscles show signs of tension. Watch for the pauses between the pulses.
- (11) Press the button **REACTION** to confirm the intensity value. The respective intensity value will be saved automatically.
- (12) The calculated accommodation quotient and the respective evaluation are displayed in a diagram.
- (13) Turn the intensity down to 0.
- (14) If necessary, repeat the procedure with inverse polarity.

5.4 Rheobase / Chronaxy

The determined *rheobase* alone cannot be considered a reliable comparatory value for the state of a nervo-muscular-system. It is, however, the initial value for measuring the *chronaxy*. It helps to evaluate the degree of damage of the nervo-muscular system.



Procedure

- (1) Attach the electrodes to the respective stimulation points (bipolar or unipolar mode of attachment).
- (2) Select the menu **DIAGNOS.**
- (3) Select the menu **RHEOBASE / CHRONAXY**.
- (4) Activate the acoustic signal, if desired.
- (5) Select the desired release time R (2-5 s, manual release key).
- (6) Select the desired impulse time T (500 or 1000 ms).
- (7) Slowly turn up the intensity with the **intensity control circuit I <6>** until the muscles show signs of tension. Watch for the pauses between the pulses.

Warning When using the manual release key, release a pulse each time you turn up the intensity!



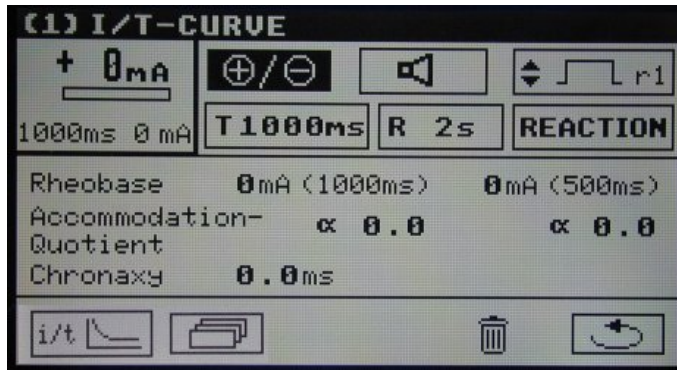
Warning Take care that the electrodes are by no means touched after the current is turned up!



- (8) Press the button **REACTION** to confirm the rheobase value. The respective rheobase value will be saved automatically.
- (9) If necessary, determine the rheobase with reverse polarity. Retain the polarity with the lower intensity value.
- (10) The instrument switches to **CHRONAXY**. An arrow in the intensity display indicates the double rheobase value.
- (11) Turn up the intensity to this value.
- (12) Slowly turn up the impulse time T until the muscles show signs of contraction. Confirm the respective impulse time T.
- (13) Press the button **REACTION** to confirm the chronaxy value.
- (14) The chronaxy value and its respective evaluation are displayed in a diagram.
- (15) Turn the intensity down to 0.
- (16) Remove the electrodes.

5.5 I/T-Curve Diagnosis

Creating an intensity-time diagram based on I/T diagnosis enables you to make statements on the degree of damage of degenerate muscles as well as suitable parameters for the therapy.



You can perform I/T-curve diagnosis using two variants: Tabular or chart form. Measurements performed can be saved and recalled at a later time.

5.5.1 Procedure in Tabular Form

- (1) Attach the electrodes to the respective stimulation points (bipolar or unipolar mode of attachment).
- (2) Select the menu **DIAGNOS.**
- (3) Select the menu **I/T-CURVE**.
- (4) Activate the acoustic signal, if desired.

a) Set the Square-wave Impulse Characteristics (RIC)

- (5) Select the desired initial pulse time T (1000 or 500ms).
- (6) Select the release time **R** (2-5 s or manual release key). Move the cursor to the command button **REACTION**.
- (7) Slowly turn up the intensity with the **intensity control circuit I <6>** until the muscles show signs of tension. Watch for the pauses between the pulses.

Warning When using the manual release key, release a pulse each time you turn up the intensity!



Warning Take care that the electrodes are by no means touched after the current is turned up!



- (8) Press the button **REACTION** to confirm the intensity value. The intensity value will be saved automatically. The pulse time **T** is switched automatically to the next lower value.
- (9) Slowly turn up the intensity again until the muscles show signs of tension. Press the button **REACTION** to confirm the intensity value again.
- (10) Repeat this cycle until all pulse times T or only the desired ones have elapsed.

- (11) Turn the intensity down to 0.

b) Set the Triangular Pulse Characteristics (DIC)

- (1) Alter the pulse shape from square to triangular.
- (2) Continue as described under a).
- (3) Turn the intensity down to 0.


c) Evaluation

- (1) Take the sheet for the I/T curve.
- (2) Fill in the intensity values for the different DIC and RIC pulse times in your form. Alter the pulse times again. The respective intensity values will be shown in the intensity display.

In the lower part of the **display <3>**, you can now read the automatically saved and calculated values for chronaxy (1000 and 500 ms), the respective accommodation quotients as well as the chronaxy (value).

Note



The values now determined using the i/t-Curve diagnosis can also be displayed graphically. Click on the  field. The chart of the determined values will now be displayed.

For additional information on how to interpret the I/T curve see the supplied therapy booklet *Introduction to Electrotherapy*. There you will also find a copy form for the I/T curve sheet.

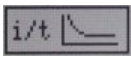
Note



Select the bin symbol to delete the stored values, for example, to make a new measurement.



5.5.2 Procedure in chart form

- (1) Attach the electrodes to the respective stimulation points (bipolar or monopolar mode of attachment).
- (2) Select the **DIAGNOS.** menu.
- (3) Select the **I/T-CURVE** menu.
- (4) Activate the acoustic signal, if required.
- (5) Select the value for the release time between the pulses (2-5 s or manual release key)
- (6) Click on the **i/t-curve**  field. The display will show the chart template.
I/T-curve diagnosis is normally started by determining the rheobase (rectangular pulse, 1000 ms or 500 ms).
- (7) Set the required pulse time.
- (8) Increase the intensity step by step with the **intensity control circuit I <6>**, until the muscle reacts. Please take into account the release time between the pulses.

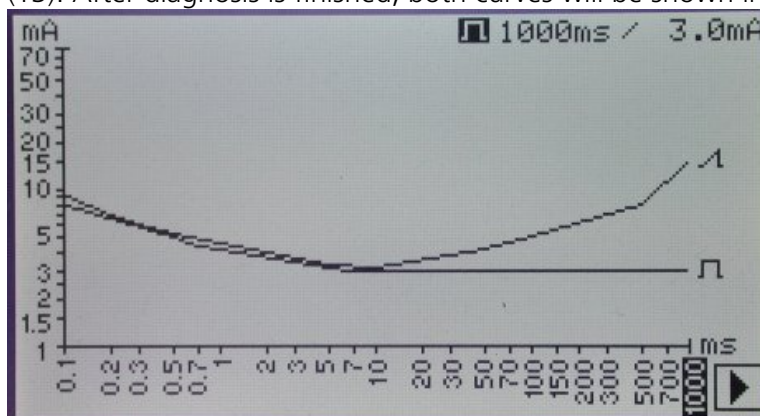
Caution When using the manual release key, be sure to trigger a pulse after each increment!



Caution Please never touch the electrodes when the intensity is turned up!



-
- (9) As soon as you notice a "minimal contraction", confirm the intensity by pressing the **data selector <5>**.
The intensity is automatically saved. The cursor automatically jumps to the next shorter pulse time.
 - (10) Please observe whether the new pulse time triggers a "minimal contraction".
If a contraction can be noticed, please reconfirm by pressing the **data selector <5>**.
If there is no contraction, slowly increase the intensity until you notice a "minimal contraction" and reconfirm by pressing the **data selector <5>**. The chart continues to be built with every confirmed value.
 - (11) Repeat this cycle until all or only your desired pulse times T are processed.
 - (12) After confirming for the smallest pulse time, the **Intens I** icon flashes in the lower status bar and prompts you to turn the intensity to zero.
 - (13) Turn the **intensity control circuit I <6>** counter-clockwise to zero. Now the device automatically switches to triangular pulses and the pulse time is set to the highest value possible.
 - (14) Determine the values for the triangular curve as described in the steps (7) to (13). After diagnosis is finished, both curves will be shown in the chart.

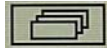




If you select pulse times with the **data selector <5>** at the lower margin of the display, the corresponding determined values are displayed top right.

You can exit this level by clicking on the arrow icon. It may be required that you run through the bottom line of the pulse times with your cursor twice. After exiting the chart level you will return to the tabular level. Here you can see the determined diagnosis codes at one glance.

5.5.3 Saving the i/t-Curve Diagnosis

The i/t-curve diagnosis has 10 memory locations to save the measured values.

- (1) In the **I/T-CURVE** mode, click on the **Save measured values**  field.
- (2) Select one of the memory locations **F1** to **F10**, where you want to save your settings.
- (3) Press the **data selector <5>**. The cursor jumps to the bottom line.
- (4) Select the **Save**  field and confirm.
- (5) Click on the  field to exit the save menu.

The chosen settings are now saved on the respective memory location and can be recalled. You can overwrite or delete saved programs at any time.



Note



For a better overview you can enter the saved measurements on a spreadsheet provided for this purpose.

5.5.4 Recalling Stored i/t-Curve Measurements

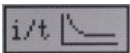
Please proceed as follows to recall a stored measurement:

- (1) In the **I/T-CURVE** mode, click on the **Save measured values**  field.
- (2) With the **data selector <5>** select one of the memory locations **F1** to **F10** and confirm. The measured values stored on the respective memory location are displayed.
- (3) Select the **Recall**  button and confirm.

The values of the desired measurements are shown on the **display <3>**.




Note



Click the **i/t-Chart**  field to display the loaded measurement as a chart.

5.5.5 Deleting Stored i/t-Curve Measurements

Please proceed as follows to delete a program:

- (1) In the **I/T-CURVE** mode, click on the **Save measured values**  field.
- (2) Using the **Dose selector <5>**, select one of the memory locations to and confirm.
- (3) Press the **Delete**  button. The measured values are deleted immediately.
- (4) Click on the  field to exit the memory menu.

The values of the measurement are deleted and the respective memory location can be assigned again.

6 Simultaneous Therapy

Simultaneous therapy means the simultaneous treatment with ultrasound and stimulation current. The ultrasonic transducer is one pole of the stimulation current circuit, a plate electrode the other one.

PHYSIOMED-Expert may be used for simultaneous therapy in combination with ultrasound therapy unit **PHYSIOSON-Expert**. Please refer to the operating instructions of the ultrasound therapy unit for more information on that type of therapy.

It is advisable to use a plate electrode of minimum size EF50 as neutral electrode. The neutral electrode is plugged into the socket No.1 (anode of circuit I) of the patient lead (page 7).

Make sure that there is enough space between the plate electrode and the transducer. If there is too little room, an error might be issued.

To ensure a stable contact for both stimulation and ultrasound therapy you must use an (electrically) conductive ultrasound gel.

Warning



Make sure you constantly keep moving the transducer on the skin of the patient (dynamic treatment)! Avoid using the transducer at one spot for a longer time (static treatment); this form of treatment might lead to damages on the patient's tissue!

Note



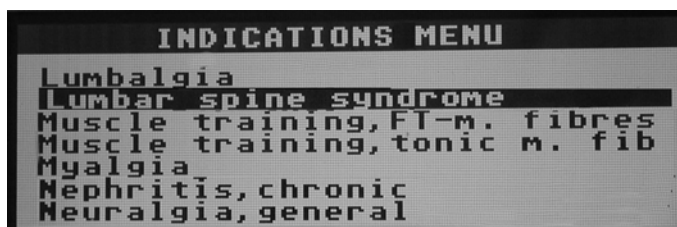
If the transducer is lifted during treatment, the stimulation current will automatically be reduced to 0; it makes sure that both therapy modes - ultrasound and stimulation current - are always applied simultaneously. As soon as the transducer is put on again the stimulation current will also rise again automatically.

7 Indications Menu

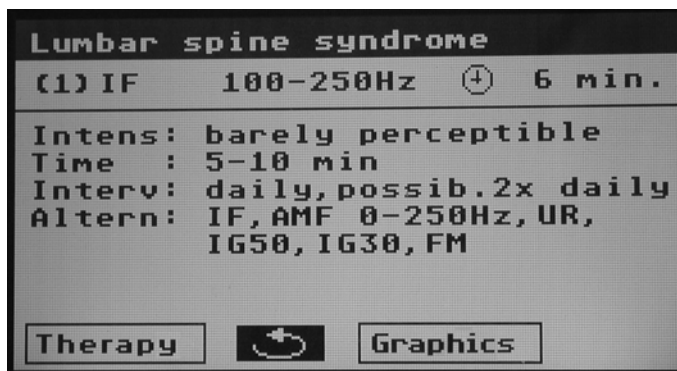
Apart from direct access to the individual current modes, the indications menu offers you another possibility to start the individual methods of treatment. With the indications menu, you may utilise proven methods of treatment within stimulation current therapy.

Proceed as follows to start a treatment with stimulation current via the indications menu:

- (1) Select the function **IND.** from the **display <3>**.
- (2) Select the desired indication from the indications menu.
Treatments with stimulation current do not contain the abbreviation (US), e.g. **Lumbar spine syndrome**.



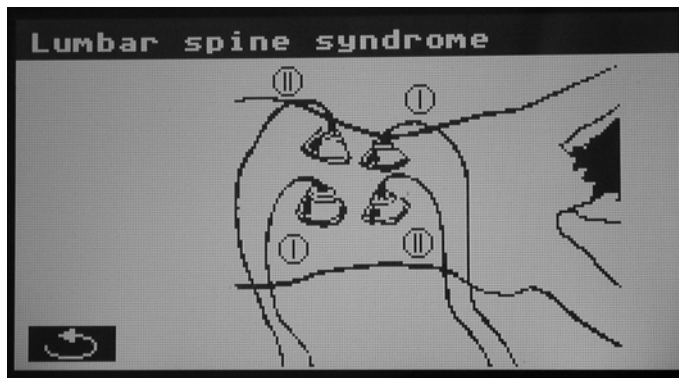
The proposed parameters for the selected indication are displayed on the display.




Furthermore, a specification of the intensity quality of the treatment, the proposed duration and the proposed frequency as well as alternative forms or treatment with individual current modes are displayed.

- (3) Select the button **Graphics**.

An illustration will be displayed which shows you the parts of the body where you can attach the electrodes. This illustration, however, is only a suggestion.



- (4) If suitable, attach the electrodes in the proposed way.
- (5) Press the button  to quit the graphics display.
- (6) Select the function **Therapy**.
- (7) If required, change the treatment parameters.
- (8) Turn up the intensity of the stimulation current with the **intensity control circuit I <6>** (and **intensity control circuit II <8>** if required). Therapy time elapses.

Warning Take care that the electrodes are by no means touched after the current is turned up!



-
- (9) After treatment, an acoustic signal will be issued. Turn the intensity down to 0.
 - (10) Remove the electrodes.

7.1.1 Spasticity treatment according to Hufschmidt / Jantsch (Tonolysis)

Spasticity treatment according to Hufschmidt and Jantsch is, as from now, one of the indications for stimulation current therapy. Corresponding stimulation patterns can be selected via the indication menu.

A rhythmically alternating stimulation of antagonistic muscle groups forms the basis of the electrical therapy of spastics, for spastic cerebral palsy, cerebral apoplexy and adductor spasms. This is achieved by first stimulating the agonistic muscles (e.g. brachial muscle) with a short, sharp individual stimulation. After a pause of 50-100 ms, the antagonistic muscles (e.g. flexors) are stimulated by an individual pulse or series of pulses.

In the HUFSCHMIDT method, a rectangular pulse of 0.1-0.3 ms in length is brought into play in circuit I to stimulate the spastic agonist. After a pause of 50-100 ms, a rectangular pulse of 0.1-0.3 ms in length follows in circuit II. This cycle is followed by a pause of 1-2 s (LANGE 2002, 526pp.).

In the JANTSCH method ("Tonolysis"), the agonist is also stimulated with a rectangular pulse of 0.1-0.3 ms in length (circuit I). There again follows a pause of 50-100 ms. Then the antagonist is stimulated with neofaradic current for 1-3 sec. Optionally, the cycles can be triggered by the patient, using the manual release key (JANTSCH 1981, 149pp.).

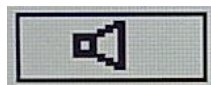
Spasticity treatment is selected via the indication register. Proceed as follows:

- (3) Select the **INDICAT.** function on the **selection field <3>**.
 - (2) In the indication menu, select either **Hufschmidt spasticity treatment** or **Jantsch spasticity treatment** and confirm your choice.
 - (3) Click on the **Treatment** selection field.
You are now in treatment mode.

Parameters for the Hufschmidt or Jantsch spasticity treatment:



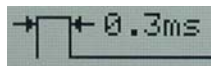
Polarity switch to swap the polarity of the two electrodes, the sign in the intensity display changes accordingly.
The sign always represents the polarity of the electrode with the red plug.



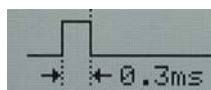
Sound marker, makes every current pulse audible



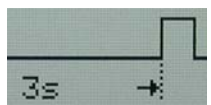
Switch field for Hufschmidt or Jantsch treatment methods



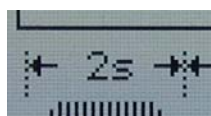
Selection of pulse length in circuit I (1st pulse on spastic agonist)
0.1 ms - 0.3 ms (upper line)



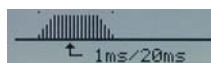
Selection of pulse length in circuit II (2nd pulse, stimulation of the antagonist according to Hufschmidt) 0.1 ms - 0.3 ms (lower line)



Selection of pause length between an pulse cycle, from 1 s - 5 s and triggering by manual release key (middle line)



Selection of pulse length in circuit II (2nd surge current, stimulation of the antagonist according to Jantsch), from 1 ms - 5 ms (lower line)

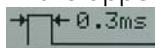


Selection of surge current characteristics according to Jantsch
Neofaradic current with 47.6 Hz (1 ms pulse, 20 ms pause) or
surge current with 100 Hz (pulse 0.3 ms)



Proceed as follows to perform the treatment:

First carry out the previously mentioned steps 1 – 3.

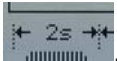
- (4) Apply the electrodes (Nos. 1 & 2) of circuit I to the spastic antagonist.
- (5) Apply the electrodes (Nos. 3 & 4) of circuit II to the antagonist.
- (6) In the upper line, select the pulse length for circuit I (spastic agonist)




Stimulation pattern according to Hufschmidt:

- (7) In the lower line, select the pulse length for circuit II (agonist) .
- (8) In the middle line, select the pause duration between the pulse cycles or triggering by manual release key .

Stimulation pattern according to Jantsch:

(7a) In the middle line, select the threshold time for circuit II (contraction duration of the antagonist) .

(8a) In the middle line, select the pause duration between the pulse cycles or triggering by manual release key .

(9a) In the lower line, select the surge current characteristics (test) .

(10a) Increase the intensity for circuit I (spastic agonist) and circuit II (antagonist) until clear contractions occur, and carry out the treatment.

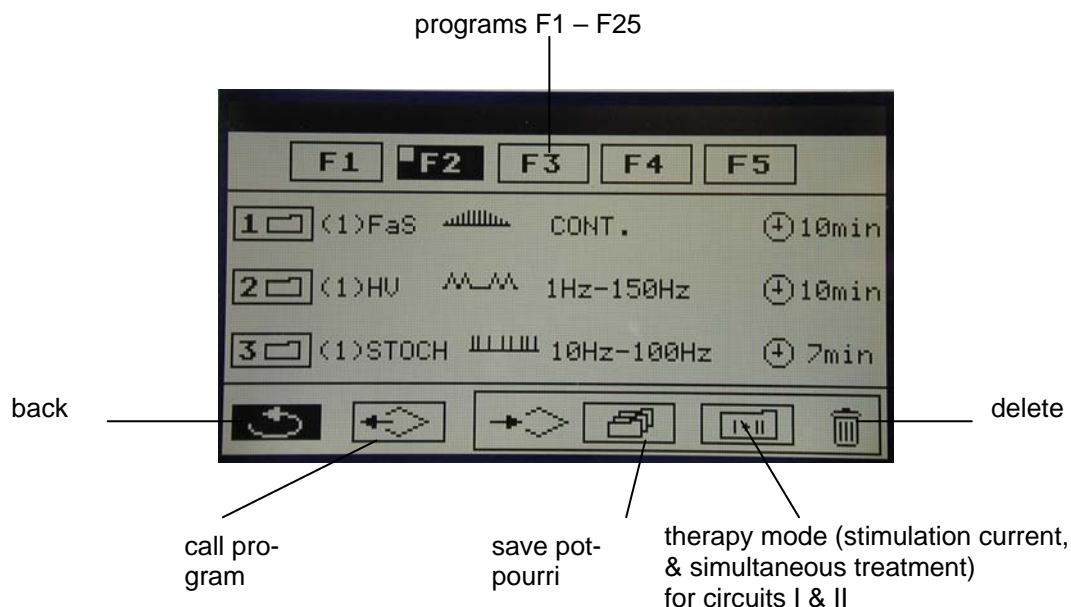
Ensure that the antagonist does not become overstrained. Initially, perform only a few contractions, and slowly increase the number of exertions (training effect).

(11a) After the treatment is completed, turn the intensity of circuits I and II down to "0" and remove the electrodes.

8 Individual Programs

You do not have to set frequently applied forms of therapy every time you want to use them – you can simply save them as individual programs. Such a program is e.g. a certain current mode with all parameters including treatment time. You may save individual programs and restart them as well as delete and overwrite them. All in all, 25 different programs are available with every program disposing of three subordinated treatments. In consequence, you may save a complete current sequence (pot-pourri).

There is an extra menu for the individual programs containing the following buttons:



8.1 Save individual therapy modes

You can save individual programs only from one current mode. You can either save the therapy mode for circuit I only or for circuit I and II together. Proceed as follows:

- (1) Select a current mode in one of the circuits I and II, or an ultrasound therapy.
- (2) Set the desired parameters.

(3) Select the symbol **save program** .

(4) Select one of the programs **F1** to **F25** to save your settings.

(5) Press the data selector. The cursor moves to the line below.

(6) Select the symbol **Save therapy form**  and confirm.

(7) The cursor moves to the vacant position 1. Confirm again.

(8) Exit the menu.

The selected settings are saved in the respective program and can now be accessed.






Note



To keep track of things you may enter the program settings in the supplied sheet.

8.2 Save Potpourri

Apart from the individual therapy forms you may also save a sequence of three current modes which can be retrieved individually. You can save individual programs for only one current mode. Proceed as follows:

- (1) Select one current mode.
 - (2) Set the desired parameters.
 - (3) Select the symbol **save program** .
 - (4) Select one of the programs **F1** to **F25** to save your settings.
 - (5) Press the data selector. The cursor moves to the line below.
 - (6) Select the symbol **save potpourri**  and confirm.
 - (7) The cursor moves to one of the vacant positions 1-3. Confirm again.
 - (8) The current settings are saved in the selected position.
 - (9) To exit the menu click on the symbol **call program** .
 - (10) Select another current mode and set the parameters.
 - (11) Select the symbol **save program** .
 - (12) Choose the same position and press the data selector again.
 - (13) Select the symbol **save potpourri**  and confirm.
 - (14) The cursor moves to a vacant position. Choose the next position and confirm again.
The current settings are saved. Proceed in the same way to save the settings for the third position.
 - (15) Exit the menu.
- The selected settings are saved in the respective program and can now be accessed.

Note



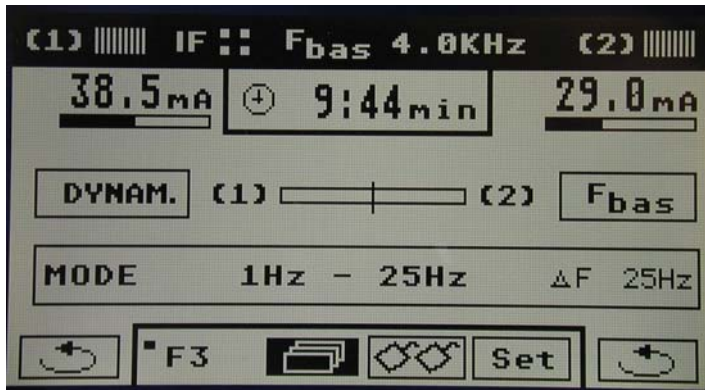
To keep track of things you may enter the program settings in the supplied sheet.

8.3 Call Program

To call a saved program proceed as follows:

- (1) Select the menu **INDIVID** from the **display <3>**.
- (2) Select one of the programs **F1** to **F25** using the **data selector <5>** and confirm.
- (3) Select the symbol **call program**  and confirm.

The selected program is set. The respective menu appears in the **display <3>**.



The program number appears in the **lower status bar <4>** (e.g. **F3**) and, in case of a potpourri, additional indicator dots showing the position within the potpourri are displayed. The number of dots corresponds to the position number in the potpourri; on the display above, e.g. the momentary mode of treatment is carried out using current no. 1 in program F3.



Using a single therapy mode, you are only shown the program number.



Note When selecting a current sequence, you always have to reset the intensity after every current mode before you can apply the next current mode. This measure enhances the protection of the patient.

8.4 Delete program

Proceed as follows to delete a program:

- (1) Select a current mode on the **display <3>**.
- (2) Select the symbol **programs** . The menu **individual programs** will be displayed.
- (3) Select one of the programs **F1** to **F25** with the **data selector <5>** and confirm.
- (4) Select the symbol **delete programs**. The bin symbol starts flashing. 
- (5) Select the program to be deleted and confirm.
- (6) Exit the menu.

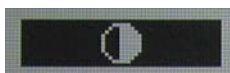
Now the program is deleted and can be newly assigned.

9 Basic Settings

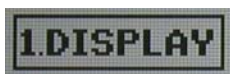
In the basic settings, you can set different parameters that are rarely altered. Select the button **SETMENU** from the **display <3>** to get to the basic settings.



The symbols have the following meaning:

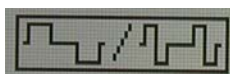


Screen contrast



Active menu when switching on the instrument
(e.g. **START MENU**)

Active menu when switching on the device
START MENU means that the start menu will appear.
With **LAST CURRENT MODE** the recently used current mode and its therapy parameters is displayed. Please consider that a current mode is stored only after two complete therapy cycles.



Biphase current: Either a break between two half waves or two half waves immediately one after the other



Quit basic settings

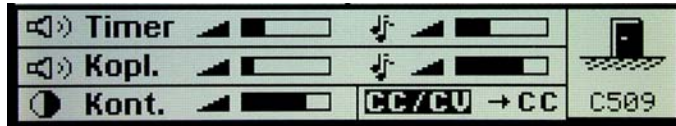
To alter a parameter, proceed as follows:

- (1) Choose **SETMENU** on the **display <3>**.
- (2) Select the desired parameter with the **data selector <5>** and confirm.
- (3) Set the desired value of the parameter. The modification will be confirmed visually and by an acoustic signal.
- (4) Quit the basic setup.

The selected settings are immediately valid.

9.1 Setup Menu

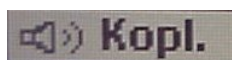
You can set some additional parameters in the setup menu.



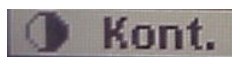
Die Symbole haben die folgende Bedeutung:



Volume and pitch of the therapy timer



Volume and pitch of the sound marker (acoustic coupling control)



Contrast of the LCD



Switching between **C**onstant **C**urrent / **C**onstant **V**oltage



Quit setup menu

To modify a parameter, proceed as follows:

- (1) Press the icon **SET** in any menu.
- (2) Select the desired parameter with the **data selector <5>** and confirm.
- (3) Set the desired value of the parameter. Modifications can be recognised immediately by means of acoustic or visual signals.
- (4) Exit the setup menu.

The selected settings are immediately valid.

Warning



Automatic output current switch-off is disabled when the instrument is in CV operation!

Note



When the instrument is switched off, it will be reset to CC operation.

It is always possible to save current modes in CV operation as individual programs.

10 General Notes

The instrument may only be operated in dry rooms designed for medical purposes, in accordance with VDE 0107, User Class 1 (rooms with patient beds, physical therapy rooms and practice rooms).

It complies with the technical specifications of IEC 601, VDE 0750 and is assigned to class IIa according to the *Council Directive concerning Medical Devices*.

It is not intended for operation in explosion hazard zones or hydrotherapy rooms.

Drastic temperature changes should be avoided, since condensation could be caused within the instrument. Do not start up the instrument until it is in temperature equilibrium with its environment!

The instrument is to be operated properly, i.e. in accordance with the *Operating Instructions*.

During operation, electromagnetic waves are emitted by the instrument. Please consider this exposure in its environment and care for sufficient distance to other electronic devices. Please also take into account that the electromagnetic waves of other devices might also interfere with the instrument and take care that these devices have sufficient distance to the unit.

Never connect the patient to a high-frequency surgical instrument simultaneously, since burns under the electrodes could be caused. Operating the instrument in the vicinity (e.g. 1 m) of a short-wave or micro-wave therapy unit may cause output irregularities and should be avoided for this reason.

11 Service, Repairs, Maintenance

The manufacturer is only obliged to guarantee the safety features of the instrument in its original state.

The instrument must be operated in accordance with the *Operating Instructions*.

Repairs to the instrument may only be performed by parties duly authorised by **PHYSIOMED Elektromedizin AG**. Any repairs performed by an authorised agent must be accompanied by written certification, describing the nature and extent of the repairs undertaken, as applicable with details regarding changes to nominal operating values or the operational range. The certification must also contain the date performed, the name of the repair company and the signature of the repairman.

When defective, components affecting the safe operation of the instrument must be replaced by manufacturer's original parts.

Upon request, wiring diagrams, parts lists and service instructions can be made available to qualified technical personnel employed by the customer.

We recommend having the instrument, including all accessories, serviced at regular intervals. Please refer to the *Manufacturer's Recommendations* (page **Error! Bookmark not defined.**) for the safety regulations control.

12 Cleaning and Disinfection

Clean your accessories and instrument on a regular basis with a disinfecting agent based on aldehyde. By any means, switch off the device prior to this and pull the mains plug.

Use a soft sponge cloth for cleaning. Be careful that no liquid substances invade the instrument. Prior to cleaning, switch off the instrument and disconnect the power lead.

Clean and disinfect the sponge and sponge bags after every treatment, and then rinse them well with fresh water, so that no residue remains on the material

Regularly check your accessories and replace any sponges and sponge bags which are contaminated, damaged or worn out through use, and which are no longer sufficiently thick.

13 Connecting other Units

13.1 Vacuum Unit

You can also attach vacuum electrodes instead of plate electrodes with viscose covers or adhesive electrodes. Use the **VAC socket <15>** to establish a connection to a vacuum unit. If the vacuum application unit is connected and switched on, the current is released automatically via the vacuum electrodes. By any means, always refer to the operating instructions of the vacuum unit!

The following vacuum units can be used in combination with **PHYSIOMED-Expert**:

- **PHYSIOVAC-Expert**

13.2 Ultrasound Therapy Unit

Simultaneous therapy means the simultaneous treatment with ultrasound and stimulation current. Use the **SIM socket <14>** to establish a connection to a ultrasound therapy unit (see also *Simultaneous Therapy* on page 53). By any means, always refer to the operating instructions of the ultrasound therapy unit!

The following ultrasound therapy units can be used in combination with **PHYSIOMED-Expert**:

- **PHYSIOSON-Expert**

14 Technical Data

Protection class	I acc. to VDE 0750 / IEC 601 BF type
CE characterisation	acc. to Council Directive concerning medical devices 93/42 EEC
Class acc. to EC 93/42	Ila
Mains connection	230 VAC \pm 10% or 115 VAC \pm 10% Observe the voltage selected at the mains module <1>
Power line frequency	50-60 Hz
Current consumption	0,3 A (at 230 V) or 0,6 A (at 115 V)
Power line input	68 VA
Line fuses	at 230 V: T 1 A at 115 V: T 2 A
Output data STIMULATION	75 mAs (peak) at 500 Ohm
Ambient temperature	+ 10°C ... + 40°C
Dimensions (W x H x D)	34.5 x 13.3 x 34.8 cm
Weight	5.1 kg

15 Accessories

Warning For safety reasons, **PHYSIOMED-Expert** has to be used exclusively with original accessories. The use of other manufacturers' accessories is at the user's risk.



Warning Plate electrodes are subject to wear and tear. The degree of wearout depends on the current mode, the frequency of use, and the intensity. The greater the galvanic component of the application is, the quicker is the wearout of the electrodes.



Since poorly conducting electrodes can lead to skin impairment, we recommend checking the electrodes regularly (at least once per quarter) using the Electrode test pen (ref. no. 00412). Alternatively you can send the electrodes to our service department for an inspection, which is liable to pay a service fee.

15.1 Standard Accessories

Ref.-No.	Description	Number
00179	Accessory tray	1
00451	Elastic velcro strap 6 x 80 cm	2
00453	Elastic velcro strap 10 x 125 cm	2
00776	Mains cable	1
00331	Manual release key	1
00163	Patient lead (4 connectors)	1
00655	Plate electrode EF 50 (set of 4)	1
00435	Viscose cover EF 50	4
00856	Operating Instructions (English)	1
00625	Introduction to Electrotherapy (English)	1

Warning An effective current density of 2 mA/cm² must not be exceeded! For this reason you should always use electrodes of a sufficient size and be especially attentive when attaching them.



For more detailed information on size and application of the electrodes in therapy refer to our therapy booklet supplied.

15.2 Additional Accessories

Ref.-No.	Description
00465	Bergony mask (set)
00460	Bow electrode (set)
00162	Connection cable (electrotherapy/ultrasound)
00580	Connection cable for PHYSIOPADS adhesive elect. (pair, red/blue)
00139	Connection cable, 65 cm (electrotherapy/vacuum)
00552	Double pad two-field electrode
00140	Elastic rubber strap
00141	Elastic rubber strap
00412	Electrode test pen
00228	Extension for patient lead (blue)
00227	Extension for patient lead (red)
00142	Fastening button
00380	Fixing rings (set of 4)
00413	Glove electrode (pair)
00155	Grip handle for punctiform electrodes
00156	Grip handle for punctiform electrodes with pushbutton
00136	Iontophoresis foil
00777	Mains cable
00775	Mains cable
00596	PHYSIOPADS adhesive electrode 13 x 8 cm, 10 sets of 2 585
00597	PHYSIOPADS adhesive electrode 13 x 8 cm, 50 sets of 2 585
00585	PHYSIOPADS adhesive electrode 13 x 8 cm, set of 2
00592	PHYSIOPADS adhesive electrode 5 x 5 cm, 10 sets of 4 587
00593	PHYSIOPADS adhesive electrode 5 x 5 cm, 50 sets of 4 587
00587	PHYSIOPADS adhesive electrode 5 x 5 cm, set of 4
00594	PHYSIOPADS adhesive electrode 9 x 5 cm, 10 sets of 4 588
00595	PHYSIOPADS adhesive electrode 9 x 5 cm, 50 sets of 4 588
00588	PHYSIOPADS adhesive electrode 9 x 5 cm, set of 4
00590	PHYSIOPADS adhesive electrode Ø 3,2 cm, 10 sets of 4 586
00591	PHYSIOPADS adhesive electrode Ø 3,2 cm, 50 sets of 4 586
00586	PHYSIOPADS adhesive electrode Ø 3,2 cm, set of 4
00530	Plate electrode EF 10 (blue/blue)
00651	Plate electrode EF 10 (blue/red)
00650	Plate electrode EF 10 (red/blue)
00531	Plate electrode EF 10 (red/red)
00474	Plate electrode EF 10 (set of 2)
00652	Plate electrode EF 10 (set of 4)
00483	Plate electrode EF 100 (1x red/1x blue) length of cable 1,5 m
00534	Plate electrode EF 100 (blue/blue)
00564	Plate electrode EF 100 (blue/blue) 1,5 m
00657	Plate electrode EF 100 (blue/red)

Ref.-No.	Description
00656	Plate electrode EF 100 (red/blue)
00535	Plate electrode EF 100 (red/red)
00565	Plate electrode EF 100 (red/red) 1,5 m
00478	Plate electrode EF 100 (set of 2)
00658	Plate electrode EF 100 (set of 4)
00536	Plate electrode EF 200 (blue/blue)
00566	Plate electrode EF 200 (blue/blue) 1,5 m
00660	Plate electrode EF 200 (blue/red)
00659	Plate electrode EF 200 (red/blue)
00537	Plate electrode EF 200 (red/red)
00480	Plate electrode EF 200 (set of 2)
00661	Plate electrode EF 200 (set of 4)
00499	Plate electrode EF 400 (blue/blue)
00498	Plate electrode EF 400 (red/red)
00497	Plate electrode EF 400 (set of 2)
00532	Plate electrode EF 50 (blue/blue)
00654	Plate electrode EF 50 (blue/red)
00653	Plate electrode EF 50 (red/blue)
00533	Plate electrode EF 50 (red/red)
00476	Plate electrode EF 50 (set of 2)
00167	Power connection lead
00157	Punctiform electrode attachment 0,8 cm
00153	Punctiform electrode attachment 1,5 cm
00151	Punctiform electrode attachment 2,5 cm
00152	Punctiform electrode attachment 3,5 cm
00543	Rectal electrode
00150	Set of punctiform electrodes incl. grip handle and viscose covers
00551	Small double pad four-field electrode
00550	Small single pad four-field electrode
00404	Sponge layer for glove electrode
00570	Transportation bag
00095	Trolley Expert
00097	Trolley Expert
00096	Trolley Expert
01001	Trolley Universal
01003	Trolley Universal II
01005	Trolley Universal III
00541	Vaginal electrode
00149	Viscose cloth
00160	Viscose cover
00158	Viscose cover
00428	Viscose cover
00424	Viscose cover
00433	Viscose cover EF 10

Ref.-No.	Description
00437	Viscose cover EF 100
00439	Viscose cover EF 200
00464	Viscose sponge 2 cm
00463	Viscose sponge 4,5 cm

16 Manufacturer's Recommendations

PHYSIOMED®

MANUFACTURER'S RECOMMENDATIONS

SAFETY REGULATIONS CONTROL

according to Medical Devices Directive

UNIT: **PHYSIOMED-Expert**

MANUFACTURER: PHYSIOMED ELEKTROMEDIZIN AG

Instrument has to undergo a safety regulation control every 18 months.

EXTENT:

- (1) Visual inspection of the instrument, accessories and accompanying papers
- (2) Function of controls and indicators
- (3) Functional testing of instrument and accessories
- (4) Curve shapes of output parameters
- (5) Output current at the patient connector
- (6) Electrical safety according to VDE 0751

	Limiting value according VDE 0751	Value first measured (new instrument)
6.1 Earth-conductor resistance (including lead 3 m)	0.3 Ohm	0.150 Ohm
6.2 Substitute device leakage current	1.0 mA	0.700 mA
6.3 Substitute patient leakage current	5.0 mA	0.100 mA

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